February, 1956

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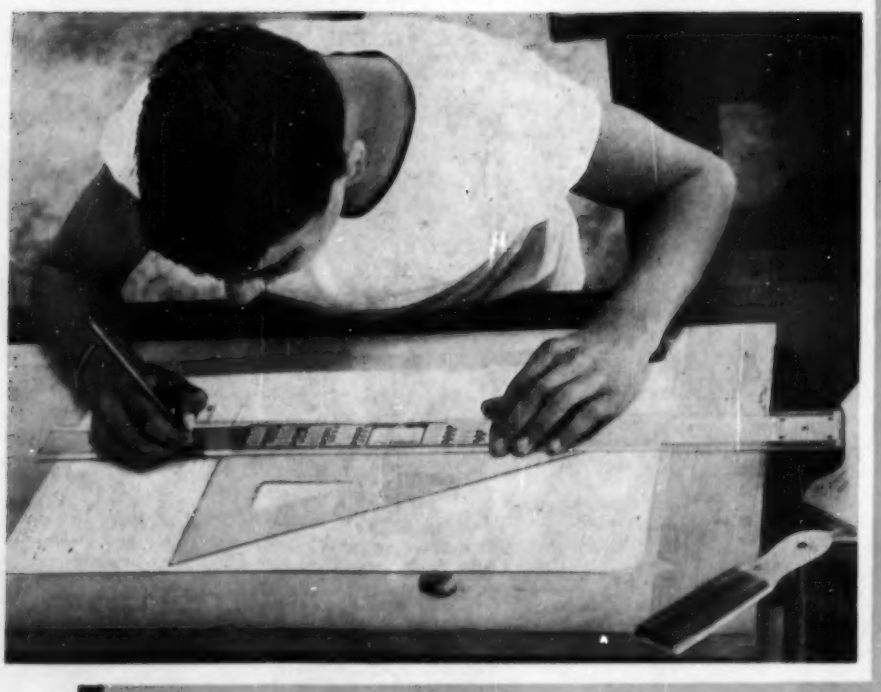
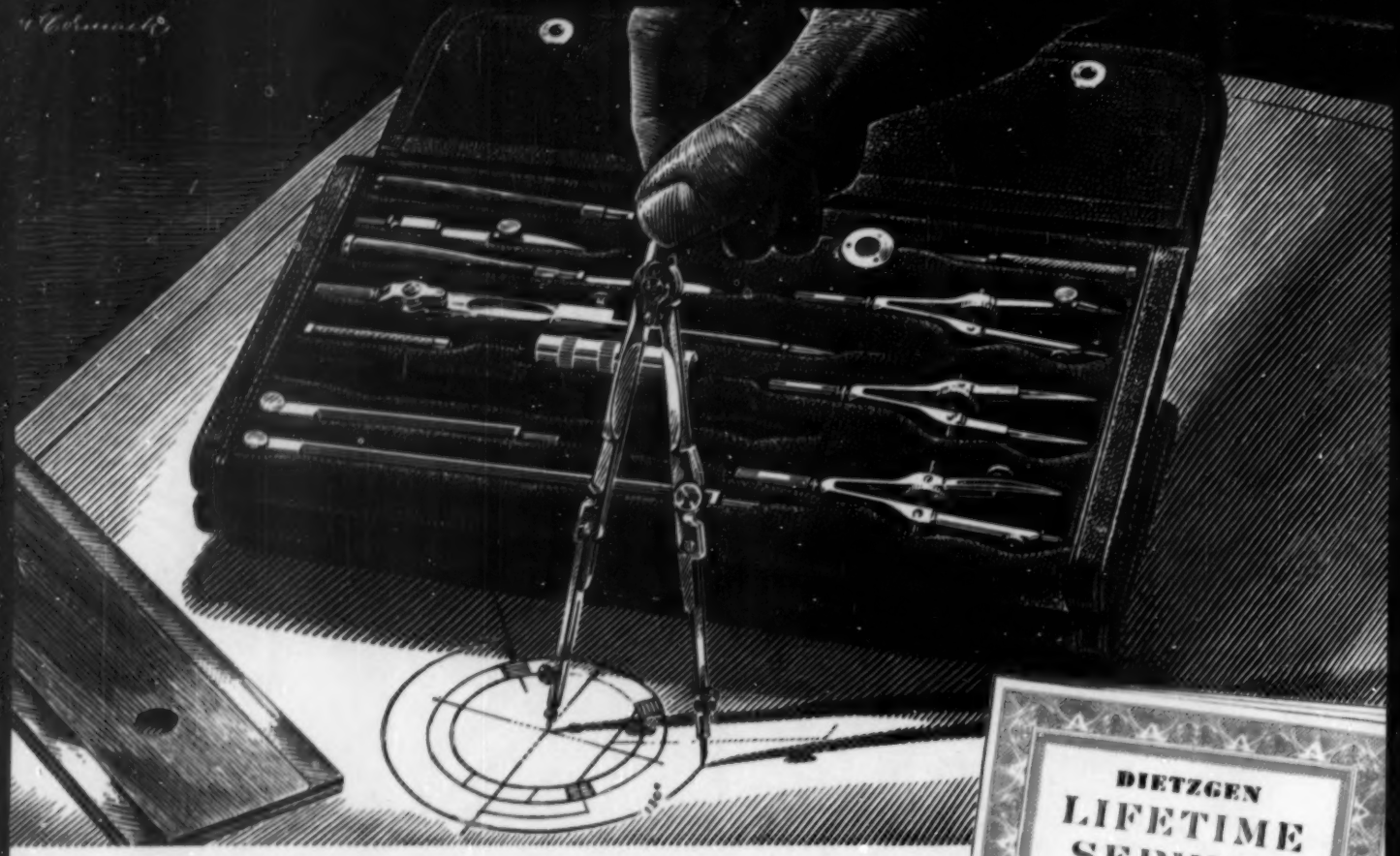
No. 2

Industrial Arts and Vocational Education



The Shop Teachers' Professional Magazine



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SOUTH BEND 1906 50th ANNIVERSARY 1956

HOW-TO project for the School Shop

NO. 15 OF A SERIES

—by NICHOLSON FILE COMPANY

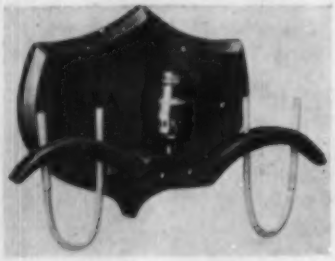
MAKING AN OXEN YOKE WALL LAMP

Nicholson is happy to stimulate interest among school-shop students by means of this attractive project. It illustrates, among other things, the precise results and fine finish obtainable through proper use of Nicholson files.

Material: The following pieces of pine, maple or white wood—1 pc. 7 1/2" x 9" x 13/16" for shield back; 1 pc. 3 1/8" x 2" x 13/16" for support; 1 pc. 11 1/2" x 1 7/8" x 13/16" for yoke. Also 2 pcs. 12" x 1/4" round rattan. Light socket, cord and plug, 3/4" x 1/8" brass nipple, 2 1 1/2" #8 f.h. wood screws, 3 3/4" #8 r.h. nickel wood screws, 2 1 1/2" #12 brass escutcheon pins, 4 1/2" #17 brads, 3 mirror clips, stain, lacquer sealer, clear lacquer, #0000 steel wool, wax. **Tools:** Coping saw, 1/4", 5/16", 1/2" auger bits, bit brace, bit gage, countersink, brad awl, 1/8", 3/16" drills, hand drill, screwdriver, hammer, side cutting pliers, file brush, Nicholson 10" Half Round Bastard and 10" Half Round Smooth files.

SCHEDULE OF OPERATIONS

Shield back: 1. Lay out pattern on cardboard using 1/2" squares. Cut out pattern and trace, holding grain vertically. 2. Cut 1/16" outside line "A" with coping saw. 3. With Nicholson 10" Half Round Bastard, shape top of shield, stroking from outside tips toward center. (Note: keep files well brushed for good finish on work.) 4. With flat side of same file, shape sides using sweeping diagonal strokes. 5. Complete bottom point with round side of same file. 6. Lay out 1/2" chamfer "B" around shield. 7. Hold same file at 45° angle and use sweeping strokes. Use half round side on inside curves, flat side on outside curves. 8. Go over chamfer with 10" Half Round Smooth file, using flat and half round sides as contours require.



Yoke: 1. Lay out design and trace as before. 2. Locate centers for 1/4" holes to hold rattan collar. Place stock in vise and bore 4 holes. 3. Cut along line "C" with coping saw. Take care to get square saw cut. 4. Shape outline with 10" Half Round Bastard, filing from center to ends with sweeping stroke. 5. File 1/8" chamfer on all 4 edges to give oval cross section. 6. Round edges of chamfer and finish file for oval yoke ends. Center portion of yoke remains square. 7. Locate center of top flat portion and bore 5/16" hole. Set bit gage at 3/4". 8. Bore 5/16" hole in yoke back to line up with top hole for lamp cord. 9. Tighten brass nipple in top of yoke hole. It will cut own threads in wood.

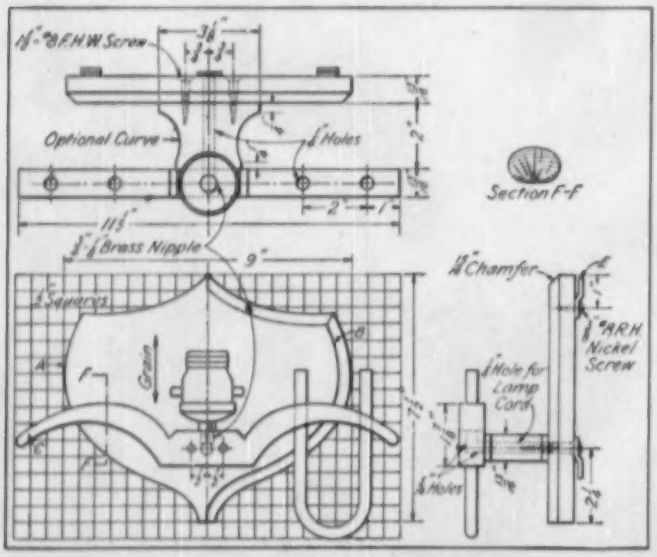
Support: 1. Lay out pattern and trace as before. 2. Shape to contour with Half Round Bastard and finish with Half Round Smooth file.

Collars. 1. Obtain 1/4" rattan at any school supply house. 2. Soak in water overnight. Shape and cut to size during assembly.

Assembly: 1. Draw vertical center line on shield back. Measure 2 1/4" from bottom and draw cross line. Mark point 3/4" on either side of center line. 2. Drill 1/8" hole at each point and countersink to fit 1 1/2" f.h. wood screw. 3. Set support against shield, mark holes, and drill with brad awl. 4. Put soap or wax on screws and fasten in place. 5. Bore 1/4" hole on center line of shield between two screws. Bore through support piece as well (for lamp cord). 6. Locate yoke center and draw cross lines 1/2" on either side. 7. Make holes with brad awl for 1 1/2" #12 brass escutcheon pins. 8. Rough cut rattan, which has been soaking, to 2 1/2" pieces and slide into 1/4" yoke holes. (It may be advisable to enlarge holes with 10" Round Bastard file.) When rattan is in place, cut off excess with side cutting pliers. Small brads, about 1/2" #17, driven in back side of yoke, will hold rattan in place. 9. Set yoke in place against support and make 2 holes for 1 1/2" #12 pins with brad awl. Put wax on pins and tap carefully into place. 10. Fasten 3 mirror clips in place. Drill additional 3/16" hole into one clip to hang lamp. Remaining two clips hold shield from wall for lamp cord clearance, and also balance wide sconce. Place clip with 2 holes ("E") 1" from top of shield on back center line, and fasten with 3/4" r.h. nickel screw. On cross line 2 1/4" from bottom back of shield, measure 2" on each side of center line and fasten remaining clips.

Finish: Sand to remove all lines and blemishes. Apply maple or pine stain and wipe dry. Apply 2 coats lacquer sealer. Rub with #0000 steel wool. Apply 1 coat clear lacquer. Wax and buff to high polish.

Lamp Assembly: Obtain lamp socket of desired type. Fasten cap to yoke center with 3/4" x 1/8" brass nipple. Pull wire from shield through support and yoke and into socket cap. Connect wires and assemble socket shell.



• The Nicholson 10" Half Round Bastard file is shown here in reduced size. It and the Nicholson 10" Half Round Smooth file (not shown—similar in appearance but with a finer cut for finishing work) are recommended for this project. They and hundreds of other Nicholson and Black Diamond files and rasps are widely available through industrial suppliers and hardware stores.

FREE REPRINTS of this page

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FEBRUARY
1956

VOL. 45 NO. 2

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 225 Broadway, New York 7, N. Y.

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This Month's Cover

The cover picture on this issue shows Roger Hohlenkamp, a drafting student at Tucson High School. His teacher is Merle Denning.

Photograph by advanced photography student, Larry Fetterly. Submitted by his teacher, Harry A. Goldstein, A.P.S.A., instructor of photography, Graphic Arts Department, Tucson High School, Tucson, Ariz.

★ ★ ★ ★

JOIN THE MARCH OF DIMES
January 3 to 31

★ ★ ★ ★

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Association News

COMING CONVENTIONS

Mar. 15–16. California Industrial Education Association, at Kern County Fair Grounds, Bakersfield, Calif. Secretary, Harry D. Bodkin, 131 Moore Hall, UCLA, Los Angeles 24, Calif.

Mar. 15–17. New Jersey Vocational and Arts Association, at Hotel Berkeley-Carteret, Asbury Park, N. J. Secretary, Mrs. Hazel N. DeCamp, 8 Mountain View Place, Irvington 11, N. J.

THE 1955 AVA CONVENTION

The 49th annual convention of the American Vocational Association was held at Atlantic City, N. J., on December 5 to 9, 1955. Vocational educators and officials from all parts of the United States were in attendance.

Approximately 85 firms were represented in the commercial exhibits which gave the educational exhibitors a wonderful opportunity to get a total overview of the tools, equipment, materials, texts, and books on related materials that are available to those who conduct the vocational classes in agriculture, business education, distributive education, home economics, industrial arts, trade and industrial education, rehabilitation services, and vocational guidance.

There also were school displays to show what the programs of vocational education and industrial arts really offer the student.

Naturally, with such a wide spread in offerings, it is practically impossible to place one's finger on any one subject and say that this or that particular meeting was the high light of the convention. Special mention, however, should go to the discussions that were held on television, vocational rehabilitation, technical education, industrial arts, automotive service instruction, and vocational rehabilitation.

Numerous national associations also met in conjunction with the AVA including the following: State Directors of Vocational Education, American Technical Education Association, the National Vocational Agricultural Teachers Association, State Supervisors of Business Education, State Supervisors of Distributive Education, the National Association of Industrial Teacher Educators, the National Council of Local Administrators of Vocational Education, and the Vocational Homemaking Teachers.

A high light of the general sessions were the speeches on the "Youth Speaks" program on which outstanding teen-agers reported on "What Vocational and Practical Arts Education had meant to them and to American Youth."

Participants were James Jackson, national president, Distributive Education Clubs of America, Zanesville, Ohio; Miss Carma Baker, vice-president, Pacific Region, Future Homemakers of America, Sparks, Nev.; Robert DeFuccio of Baldwin, N. Y.; Terry McGowan of San Antonio, Tex.; Miss Mary Bartram Robeson, past president, Future Business Leaders of America, Culpeper, Va.; and Lennie Howard Gamage, vice-president, Southern Region, Future Farmers of America, Cartersville, Va.

At the second general session, J. C. Woodin gave an excellent tribute in memory of our deceased vocational leader, J. C. Wright.

Billie Davis, writer and Sunday school representative for the Assemblies of God, Bettendorf, Iowa, gave a fine address on "I Believe in Our Public Schools."

The main speaker at the AVA banquet on Thursday evening was Arthur H. Motley, president of Parade Publication Inc., New York City.

The feature of the evening was the presentation of a pageant "Here is New Jersey" by a group of 25 Atlantic City High School students. Colorful tableaux depicted the various phases in the development of New Jersey from Colonial times to the present in the fields of agriculture, industry, education, recreation, etc.

The annual dance immediately followed this program.

Mark Nichols, past president of AVA, was the toastmaster.

Industrial Arts Education

The Wednesday morning session of the industrial-arts group was devoted to a discussion of television in industrial arts.

Donald Moon, Arthur Taggert, Joe Kennedy, teachers of industrial arts in the Pittsburgh, Pa., area, presented a kinescope on shop talk.

A panel then discussed "What Do You Do Locally With Television Programs?" The panel members were J. Lyman Goldsmith, John M. Hurley, Ivan Hostetler, Donald Moon, Arthur Taggert, and Joe Kennedy.

Roy G. Fales was chairman of the afternoon industrial-arts session on "The Place

(Continued on page 6A)

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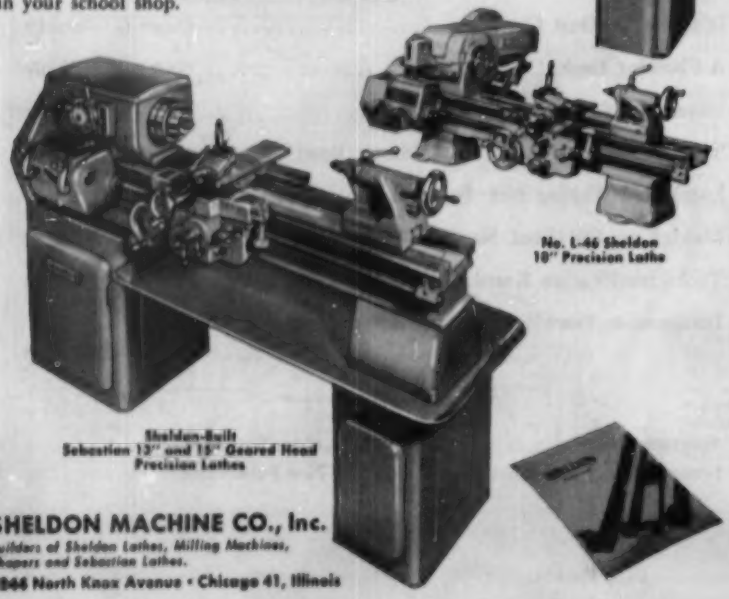

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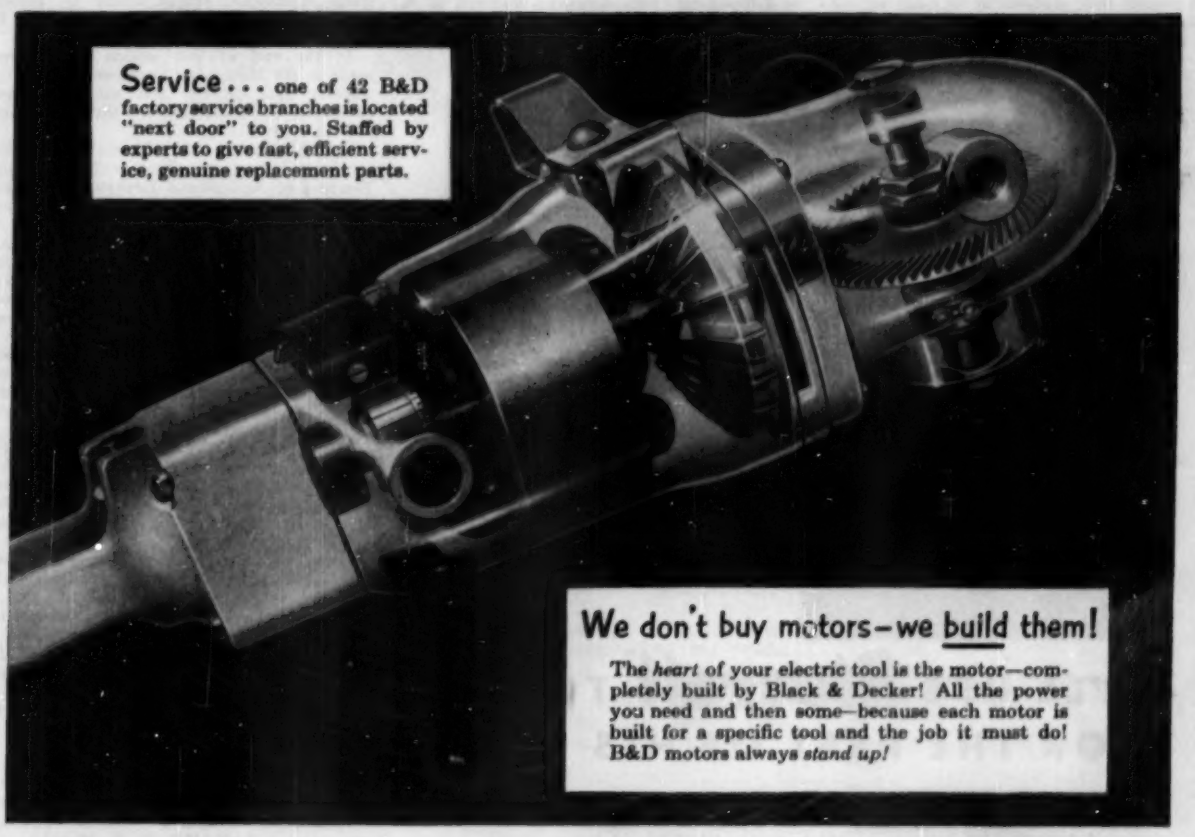

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ASSOCIATION NEWS

(Continued from page 4A)

of Drafting and Planning in the Industrial-Arts Curriculum."

Donald E. Helper pointed out that the student should be taught how to apply drawing to his shopwork. Better than teaching him orthographic drawing at the very beginning is to prepare him so that he can sketch his first shop project.

Carlton Bauer emphasized the fact that instructors should use sketching continuously while teaching.

Shriver L. Coover advises drawing teachers to prepare their students so they can use self-evaluation scales to judge their own drawings.

Demonstrations in industrial arts with William J. Wilkinson as chairman, presented a demonstration of electronic equipment by Joseph Earl Vargo of the Universal Scientific Company.

At the Thursday morning session, from 8:30 to 10:15, Kermit A. Seefeld presided at a meeting on industrial-arts design. The speakers at this meeting were Burl N. Osburn, who spoke on "Training the Designer"; Robert A. Tinkham, who discussed "The Significance of the Contemporary Design Movement as it Relates to Industrial Arts"; and Tracy B. Nabers, who presented industry's view on "The Improvement of Industrial Arts Design."

Alexander F. Bick spoke on "The A.B.C.'s of Project Selection."

Educational Television was discussed at a special meeting on Thursday morning at 9:00. Dr. William F. Rasche presided.

Ralph Steetle, executive director, joint committee on educational television, Washington, D. C., spoke on "Educational Television Today." He stated that educational television stations were in existence at East Lansing, Mich.; Madison, Wis.; Urbana, Ill.; Ames, Iowa; Milwaukee Vocational School, Milwaukee, Wis.; Cincinnati, Ohio; Pittsburgh, Pa.; etc.

He stated that T.V. courses for adults who did not finish the eighth grade were started in 1952, and that 23 completed the work for high school graduation during the past year.

Ralph Steetle also acted as leader of a panel on "Vocational Education's Stake in Television." The panel speakers were H. E. Barg, Martha A. Gable, Frank C. Moore, Philip Seagren, Lowel B. Selby, and H. P. Sweaney.

At the end of this session a kinescope made at the Milwaukee Vocational School for teaching safe driving, was shown. It was developed co-operatively by the school and the AAA of Wisconsin.

The Automobile Manufacturers Luncheon for State Supervisors, Teacher Trainers, and Teachers of Agricultural Education was held on Thursday at 12:00 noon. Those who attended were presented with a copy of "Standards for Automotive Service Instruction in Schools," published by the Automotive Industry Vocational Education Conference, of which Andrew D. Althouse, Detroit Board of Education, Detroit, Mich., is co-chairman.

Officers elected by the National Association of State Directors of Vocational Education are: Wesley P. Smith, president; E. C. Comstock, vice-president; and Ralph Howard, secretary-treasurer.

The National Vocational Agricultural Teachers Association elected the following vice-presidents: Region 2, Kenneth Henderson, with Joseph Winkle as alternate; Region 4, Paul P. Mechling, with Earl McKim as alternate.

Lorenzo E. Peterson was elected president of the American Technical Education Association.

Frank J. Coyle was named vice-president, and Carl Turnquist, secretary-treasurer.

Robert Howey was elected president of the National Vocational Agricultural Teachers Association.

Wesley P. Smith was elected president of the National Association of State Directors of Vocational Education. He succeeds C. L. Greiber.

Other officers named were: E. C. Comstock, vice-president; and Ralph Howard, secretary-treasurer. Executive committee members chosen were J. E. Hill, H. E. Mauldin, and John Lowe.

Dr. Harold J. Mahoney was elected chairman of the North Atlantic Region, National Association of Guidance Supervisors and Counselor Trainers. Robert Stoughton was chosen secretary.

O. H. Beaty was re-elected president of the National Association of State Supervisors of Trade and Industrial Education.

Merton Wheeler was named vice-president, and Blanche Nechanicky, of Albany, N. Y., secretary-treasurer.

John R. Waldeck was elected president of the Distributive Education Clubs of America, Inc., and William Slattery was named secretary.

The House of Delegates met at 9:00 a.m., on Friday, December 9.

Cecil E. Stanley, president of the American Vocational Association, presided. It was decided at this meeting to raise the dues in order to put the association on a better financial basis. It was also decided to give all members an opportunity to have a voice in the election of the officers by having a mail vote.

The officers elected for 1956 are: president,

(Continued on page 32A)

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Personal News

ROBERT SWANSON RECEIVES DOCTORAL DEGREE

The University of Minnesota recently granted a doctoral degree to Robert Swanson, assistant professor of industrial education at Stout State College. Dr. Swanson holds both the bachelor of science and master of science in industrial education from Stout.

For his dissertation, Dr. Swanson chose "The Operational Definition and Measurement of Educational Philosophy."

FRANK JUDISH DIES

Frank Judish, director of vocational and adult education at Fort Dodge High School and Junior College, Fort Dodge, Iowa, passed away during the past summer.

Mr. Judish was a native of Michigan having lived his early life at Iron Mountain. He was educated in the Stambaugh, Mich., schools, receiving his bachelor's degree from Stout Institute, and his master's degree in industrial education from Iowa State College in 1941.

ARTHUR L. PHILLIPS EDITOR FOR WELDING HANDBOOK

The American Welding Society has appointed Arthur L. Phillips Editor of the Welding Handbook. Mr. Phillips has been associated with the metals field for many years. During the past four years he has specialized in welding technology and has been engaged in writing and editing numerous handbooks and manuals on applied welding for the Eutectic Welding Alloys Corporation. He has written over 200 feature articles on welding and related subjects.

He also wrote the scripts and directed the production of two films on welding practices and was responsible for the writing and recording of a complete training course for welders.

JOHN J. SCHUELE DIES

John J. Schuele, 68, died recently after a short illness at his home in Milwaukee, Wis. He was an instructor in the electrical department of the Vocational School for the last 24 years.

Mr. Schuele was a member of the Wisconsin Association for Vocational and Adult Education, the South Side Community Club, South Division Civic Association, and the Milwaukee Swiss-American Fraternal society.

♦ Bernard Josif returned to his position in the Department of Industrial Arts, Ball State Teachers College, Muncie, Ind., after a year's leave of absence to continue his work toward the doctorate degree at Northwestern University.

♦ Forrest Cullings of Ball State Teachers College, Muncie, Ind., and Alva Jared of Western Illinois State College, Macomb, Ill., were awarded Industrial Arts Fellowships for the school year 1955–56. Both men serve as graduate assistants in the Industrial Arts Department, Ball State Teachers College.

♦ Leland B. Luchsinger, formerly specialist in industrial preparatory training in the Industrial Education Department, Division of Extension, The University of Texas, Austin, Tex., has accepted a position as director of adult education, Kilgore College, Kilgore, Tex.

For the past four years Mr. Luchsinger's duties included primarily being state adviser of a youth organization for high school students enrolled in trade and industrial education courses, the Vocational Industrial Club of Texas.

♦ Dr. Charles A. Bunten has accepted a position in metals in the Industrial Arts Department, Ball State Teachers College, Muncie, Ind.

Dr. Bunten did his undergraduate work at Eastern Illinois State College, he received his master's degree from Bradley University, and in the spring of 1955 was awarded the doctorate degree from the University of Missouri.

♦ Dr. Walter E. Burdette has accepted a position in woods in the Industrial Arts Department, Ball State Teachers College, Muncie, Ind.

He did his undergraduate work at Kansas State Teachers College, he received his master's degree from Kansas State Teachers College, and in the spring of 1955 was awarded the doctorate degree from the University of Missouri.

♦ Paul E. Harrison, Jr., and Glenn D. Warrick have completed the requirements for doctor of philosophy degrees at the University of Maryland, College Park, Md.

Dr. Harrison's study concerned the "Problems of Beginning Industrial Arts Teachers." He is currently teaching at the Chicago Teachers College.

Dr. Warrick's dissertation is titled "An Instrument for the Evaluation of a Secondary School Industrial Arts Program." Dr. Warrick is supervisor of industrial arts in the Long Beach Public Schools.

♦ Charles L. Thomas, formerly at Colorado Springs, Colo., Senior High School, received his master's degree at Stout State College, Menomonie, Wis., and has been appointed assistant professor of industrial education at Southwestern Louisiana Institute, Lafayette, La.

Mr. Thomas is engaged in the development and organization of a graphic arts section in the Industrial Education Department.

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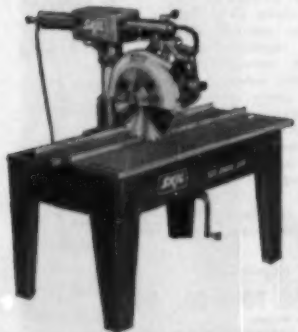

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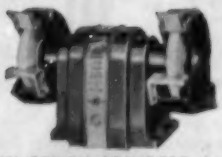

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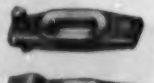

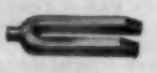

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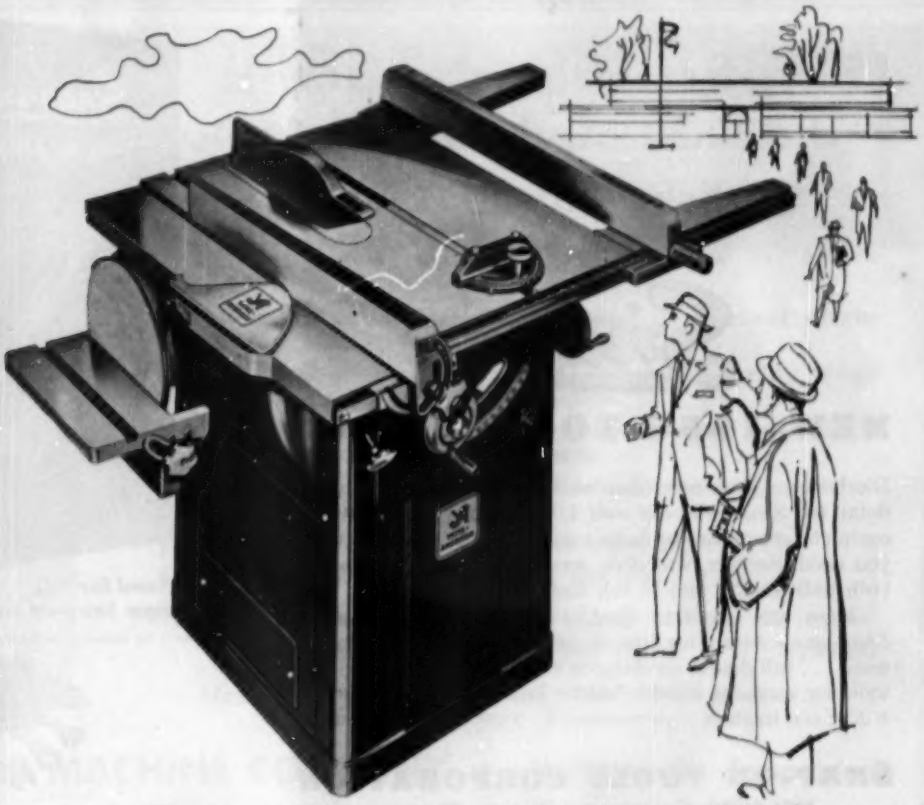

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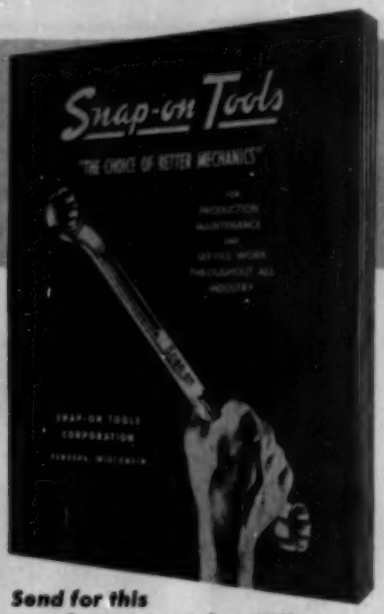

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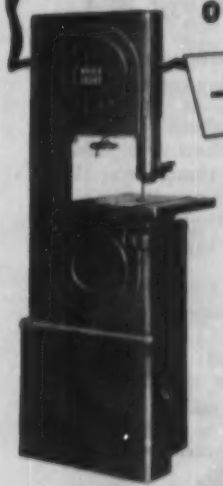

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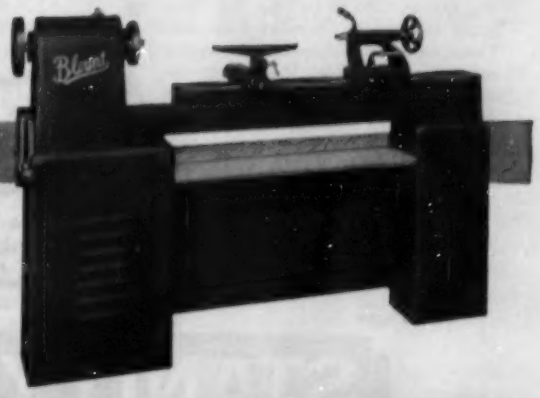

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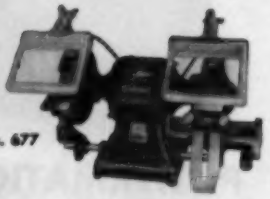

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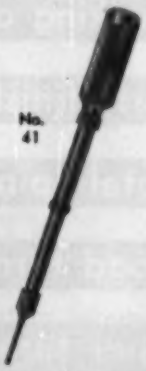

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
FEBRUARY 1956

An Interesting Study

Practice Teaching in Industrial Arts — A Research Report

WILLIAM E. HUSS

Chairman, Department of Industrial-Arts Laboratories

State University of New York Teachers College

Oswego, N. Y.

Educators are increasingly recognizing the importance of student teaching in the professional development of teachers. The student teaching experience becomes the transition from the theoretical to the practical. It involves patterns of growth in teaching abilities. This study of the value of student teaching in industrial arts attempted to discover professional and technical teaching abilities of student teachers through a program of evaluation and appraisal. It was expected that an appraisal of the extent to which growth takes place during student teaching would furnish clues to the unique contributions to student teaching.

The newer concept of industrial arts as a broad program of general education has developed so rapidly in the past decade that it has been necessary at times to make program changes in technical and professional college courses based largely on hypotheses. Once these changes in practices are established in an educational program, they tend to become permanent. This condition calls for a periodic inventory of educational practices coupled with an evaluation of these practices with respect to the aims and philosophy of the program. The effectiveness of the educational experience should be judged in the light of *values* that are esteemed highly worthy of accepting. It is to fill such a need for evaluation that this study was undertaken.

Student Teaching and its Effects

A search experimentally for the professional development that takes place during student teaching required the selection of a program of industrial-arts teacher education with adequate facilities. The program needed a sufficient number of industrial-arts student teachers to make the results significant. A state-wide, off-campus, full-semester, full-time program where master teachers may be called upon to make a periodic appraisal of the progress of student teachers was needed. The characteristics of the student teaching program conducted by the State University of New York's Teachers College at Oswego seemed to justify it as a choice.

Accordingly, a plan was made to study the student teaching experience by means of evaluating student teacher growth through the isolation of abilities in teaching activities at the state-wide co-operating schools associated with this program.

The study was limited to observable abilities as a means of obtaining evidence of teaching effectiveness in the professional and technical phases of industrial-arts teacher education.

It was planned to isolate the abilities in teaching activities by carrying on a program of evaluation consisting of the development and refinement of a rating scale to be used for recording four evaluations by master teachers of performance in 37 teaching abilities and performance in 16 technical areas by each student teacher enrolled each semester during the college year. It was expected that the data furnished by the rating scale would reveal the areas of greatest growth during student teaching as well as the areas of greatest strength at the time of entry into student teaching. It was recognized that a rating scale to be used in a program of appraisal must be in harmony with an acceptable philosophy of education.

It was felt that the quality of the product of any school can be studied satisfactorily and judged fairly only in the light of its own philosophy of education, its particular purposes and the nature of the American democratic-industrial society which it serves. Accordingly, this study undertook to evaluate the work of student teachers in terms of the expressed objectives of the program of teacher education involved in this study.

Likewise, a program of teacher education must be designed with respect to a concept of general education useful for education in public schools. Hence, any statement of purposes of teacher educa-

tion must be integral with a philosophy of general education as a means of illustrating the basis for practices carried on in teacher education.

Studying the Democratic-Industrial Aspects of American Life

Education in America looks to the ideals of the American way of life and finds there a profound loyalty to democratic ideals with a desire to benefit from the fruits of an industrial society. On the basis of those two characteristics of American society a philosophy of general education was developed.

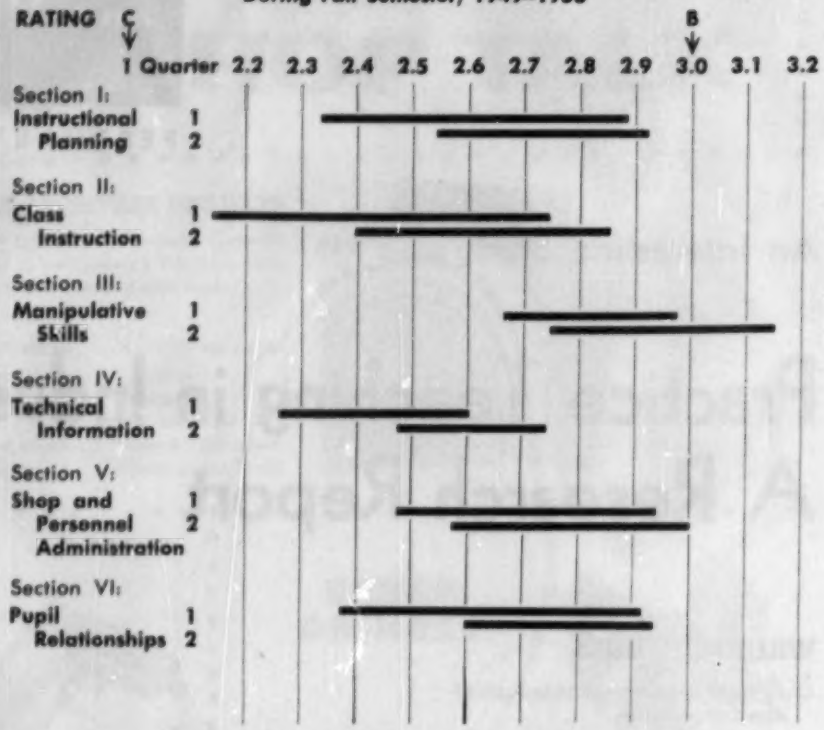
An analysis of the democratic and industrial-technological aspects of American life resulted in an acceptance of the purposes of education as developed by the Educational Policies Commission of the N.E.A. The descriptions of the characteristics of individuals achieving these objectives make this set of objectives particularly useful and adaptable as the foundation for a statement of philosophy representing a point of view that dealing with descriptions of *behavior changes* expected of individual learners is an effective way to put a philosophy into practice. Such a technique also facilitates the type of evalution represented in this study.

Close examination of the philosophy reveals that several features are considered to be of prime importance and are emphasized in the college program. Some of these are: (1) an emphasis on student planning of projects as a means of developing the ability to think reflectively, (2) a belief that democratic living is the foundation for education and should result in a democratic approach to teaching, (3) an emphasis on the importance of working with individuals, (4) a recognition of the increased efficiency in teaching resulting from the effective use of teaching methods and teaching aids, and (5) an emphasis on the importance of self-assurance and a feeling of success in the learning process. The philosophy on which this study is based is one whose proponents conceive the school as a social agent, and believe that adaptation to change is a basic principle of educational philosophy.

A philosophy, such as this, places stress on the importance of democracy in the shop, considers industrial arts as a study of industry and places high value on individual initiative and responsibility.

The objectives of industrial arts have as their function the making of optimum contributions toward the achievement of the objectives of general education. Attempts were made to show that industrials arts can lend itself to effective

FIG. 1. Mean Gains Made by Student Teachers on Rating Scale Sections* During Fall Semester, 1949–1950



* Ratings were recorded on a scale where A = 4, B = 3, C = 2, D = 1, and E = 0.

achievement of these goals. It was shown that the objectives of industrial arts: (1) Exploration, (2) Recreation, (3) Aesthetic Appreciation, (4) Consumer Knowledges, (5) Guidance, (6) Creative Expression, (7) Social Relationships, and (8) Limited Skills, are in substance derived from the objectives of general education.

An important way in which industrial arts can contribute to the newer requirements in a democratic-industrial civilization is through a process of vitalizing and enriching the total school program. This purpose is the same whether industrial arts is taught separately or as a part of a core program in the curriculum. It must be realized that other subjects also contribute, in fact, often it is difficult to discern where the contributions of one subject end and those of another begin.

Master teachers were asked to consider the five degrees of achievement in each of the abilities described in the rating scale. They were asked to check the space representing the statement which best described the general practice of the student teacher during the period of each evaluation. Master teachers were told that the compiled results obtained from the ratings of many student teachers would be used to study their strengths and weaknesses as a group and to study the unique contribution of the student teaching experience. They were asked to make one rating during the first week of actual teaching and one rating during the last week as a means of appraising the growth during the period of practice teaching.

Statistical analysis of the scores and items on the rating scale that would show the strengths and weaknesses of practice teachers as a group and the unique contribution of the student teaching experience was planned and carried out. The data were examined for implications founded upon the statement of educational philosophy concerning the status and growth during practice teaching.

Gathering Data

The data obtained from the evaluation techniques are presented in the study in a series of 38 tables and two graphs. An appraisal of the contributions to the education of teachers was inferred from data such as that summarized in a graphic manner in Figure 1.

The following characteristics of Figure 1 should be noted:

1. Gains are greater during first experience than second.

2. Beginning of second experience is lower than end of first.

3. Achievement at finish of both experiences are nearly the same.

4. Most gain is in class instruction.

5. Highest level of performance is in manipulative skills.

6. Least gain is in technical information.

7. Lowest level of performance at the start is in class instruction and technical information.

A Study of Gains Made on Rating Scale Items. The unique contributions of the student teaching experience may be discovered by finding the gain made on each of the rating scale items. Accordingly, the cumulative gain for each item was calculated from the master tables and presented in Figure 2.

Abilities of Student Teachers Arranged in the Order of Greatest Gains in Practice Teaching. The analysis of the data in Figure 2 by finding the significance of each item in terms of its standard deviation from the mean permits an arrangement of items according to the following pattern:

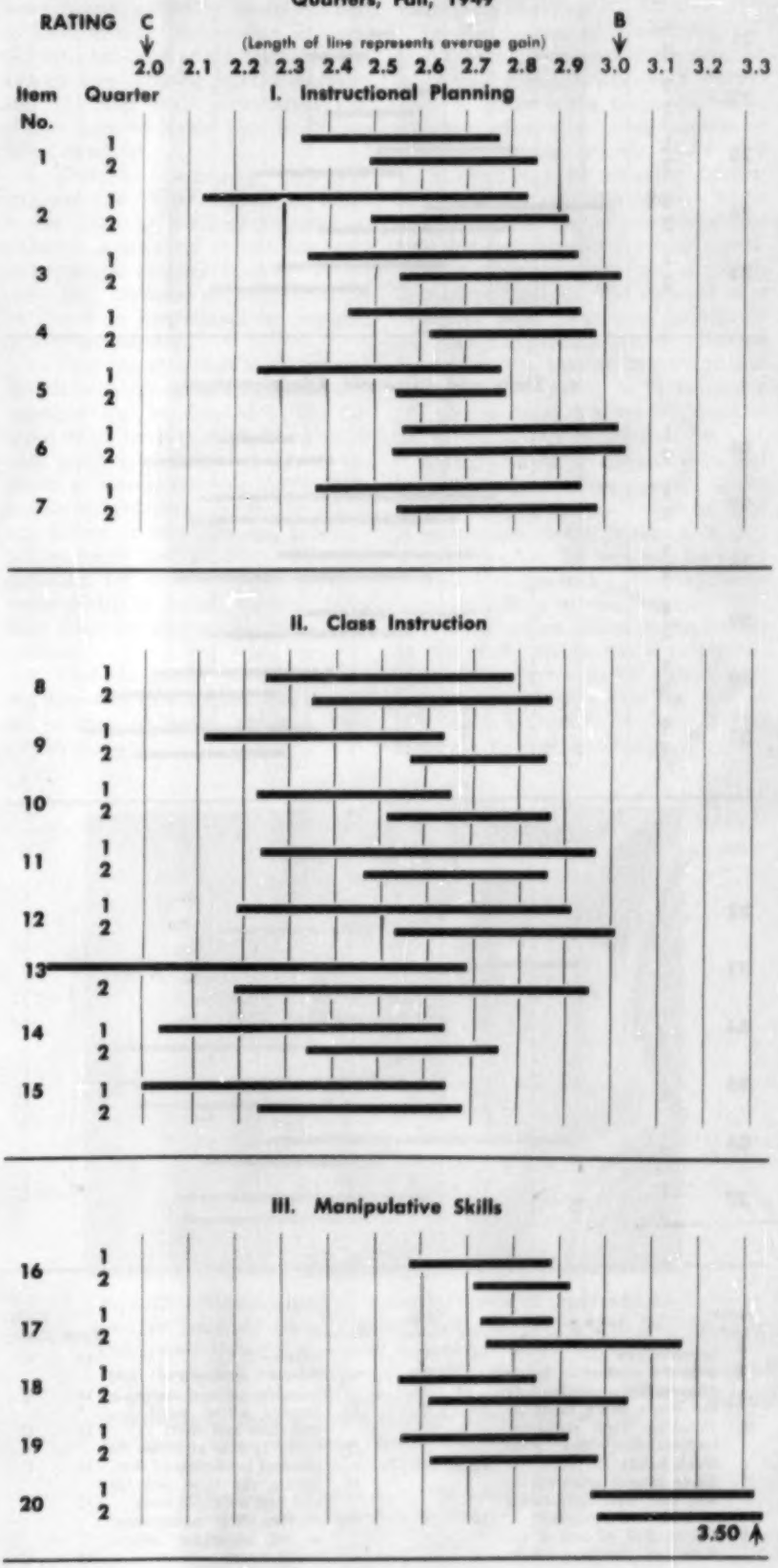
Gain Rating	*Standard Deviation*	*Range of Mean Gain*
A	1⅓σ to 3σ	.550 to .670
B	⅔σ to 1⅓σ	.470 to .550
C	⅓σ to ⅔σ	.390 to .470
D	1⅓σ to ⅓σ	.310 to .390
E	3σ to 1⅓σ	.190 to .310

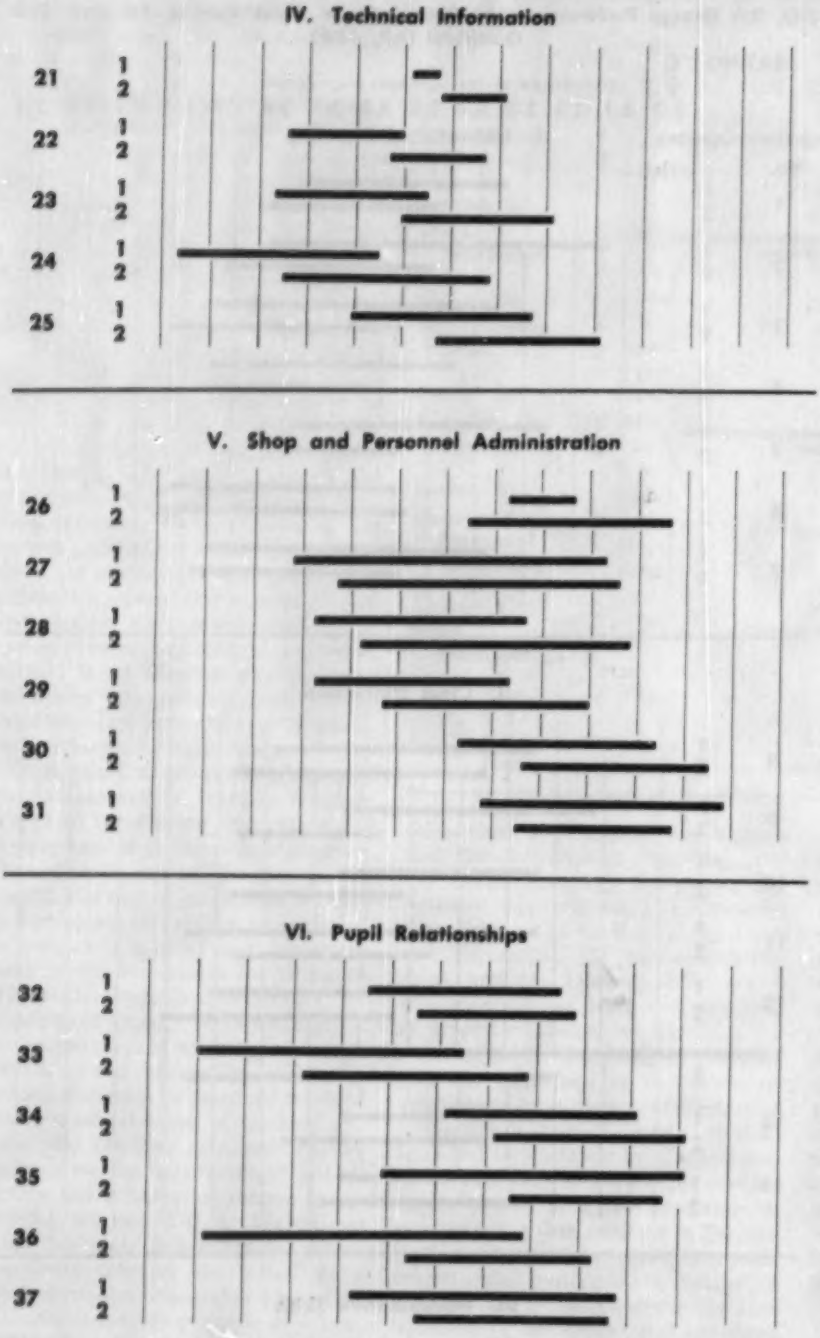
The following list of items of ability were taken from the rating scale and arranged in rank order with the gain rating included.

Abilities of Student Teachers Arranged in Rank Order.

Item Number		*Rank*	*Gain Rating*
12.	Provides a balance of teacher and pupil participation	1	A
27.	Provides arrangement of pupils appropriate to the activity	2	A
13.	Provides for individual differences	3	A
8.	Uses introduction to arouse interest in lesson and show application	4	A
15.	Secures valid evidence of results of instruction for both immediate and long range evaluation	5	B
33.	Interprets and uses significant information about individuals for educational purposes	6	B
3.	Adapts the unit or daily plans to the course of study as a whole in ways which meet the needs of the learners	7	B
32.	Shows evidence of understanding the nature and needs of pupils	8	B
2.	Conceives objectives in terms of pupil knowledges, understandings, skills, habits, attitudes, and		

FIG. 2. Group Performance in Rating Scale Items During 1st and 2nd Quarters, Fall, 1949


RATING
C
B
(Length of line represents average gain)
2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3
Item No.
Quarter
I. Instructional Planning
1 2 3 4 5 6 7
II. Class Instruction
8 9 10 11 12 13 14 15
III. Manipulative Skills
16 17 18 19 20
3.50



Item Number		Rank	Gain Rating
	appreciations	9	C
7.	Selects a method of lesson presentation appropriate to the lesson being taught	10	C
36.	Develops pupil initiative, responsibility, and good work habits	11	C
19.	Gives careful attention to the care and adjustment of tools and equipment	12	C
9.	Shows skill in and a variety of teaching techniques	13	C
6.	Selects appropriate and valuable subject materials	14	C
35.	Secures active pupil cooperation and effort	15	C
28.	Gives careful attention to physical conditions of shop	16	C
17.	Selects the most suitable and best available tools	17	C
26.	Accepts shop management as an important educational means	18	C
1.	Is guided by sound educational aims of industrial arts, such as, exploratory, consumer, avocational, and social relationships	19	C
11.	Formulates clear and purposeful questions	20	C
24.	Uses apt illustrations from many sources	21	C
23.	Selects technical teaching materials wisely for specific purposes	22	C
30.	Uses good judgment in dealing with personnel, tools, and materials	23	C
5.	Bases plans for procedures on accepted psychology of learning	24	C
14.	Uses a variety of teaching aids to promote learning	25	C
37.	Develops pupil self-control and good social attitudes	26	C
4.	Provides in lesson plan for pupils to participate in the development of purposes	27	C
10.	Uses subject matter to promote thinking and planning	28	C
31.	Creates a wholesome democratic shop atmosphere	29	C
18.	Uses tools as rapidly as the job requires	30	D
25.	Constantly searches for new ideas and technical progress	31	D
34.	Shows respect for pupil personality with patience and tact	32	D
29.	Is a good shop housekeeper	33	D
16.	Handles tools with considerable skill	34	D
20.	Uses tools in a safe manner	35	D
22.	Knows intimately the technical information in the area being taught	36	E
21.	Has a fund of reliable technical information	37	E

Conclusions

Significant trends and implications for the whole practice teaching group that were found and interpreted served as the basis for drawing the following conclusions:

1. That student teachers showed average growth during practice teaching in the following areas of activity: (1) understanding and using industrial-arts objectives, (2) using democratic practices in the shop, (3) developing self-assurance and a feeling of success in learners, (4) questioning and evaluation, and (5) managing a shop and personnel organization.

2. That ratios of strengths to weaknesses in machine operations were relatively low compared to hand tool operations.

3. That a relatively small growth in the following areas was evident: (1) the ability to promote pupil thinking and planning, (2) the ability and zeal to use teaching aids, and (3) the ability to demonstrate competency in manipulative skills.

4. That student teachers are relatively weak in technical information at both the start and finish of practice teaching.

5. That student teachers are relatively strong in manipulative skills when judged by master teachers at the start of practice teaching but show relatively small gains during practice teaching.

6. That considerable growth is evident in considering learners as individuals during practice teaching. Student teachers are relatively weak at the start but show large gains during practice teaching.

7. That considerably greater growth takes place during the first nine-week period than during the second, and that a retrogression occurs between the end of the first experience and the beginning of the second resulting in approximately the same achievement at the end of both experiences.

8. That the major activities which show greatest growth during practice teaching are those specifically related to methods in teaching.

9. That student teachers are relatively weak at the start of practice teaching in interpreting and using significant information about individuals as well as in developing pupil initiative, responsibility, and good work habits.

Recommendations

The experience gained from conducting this investigation and from the intensive study of the data collected naturally resulted in certain conclusions and convictions emerging. It is on the basis of these conclusions that the following tentative recommendations were made. Due to the nature of these recommendations, they must be kept subject to revision in the light of further findings.

1. That more stress be placed on machine operations in shop courses since ratios of strengths to weaknesses were so low in this area.

2. That the average performance in the understanding and use of objectives be called to the attention of instructors in both the technical and professional courses.

3. That more emphasis on student planning of projects be incorporated in all shop and methods courses.

4. That the general lack of ability and zeal in the use of teaching aids be called to the attention of staff members in the hope that they will consider ways of improving the present situation.

5. That the attention of master teachers be called to certain findings of this study, such as: (1) that student teachers are relatively strong in manipulative skills when judged by master teachers at the beginning of practice teaching but show relatively small gains during practice teaching, (2) that student teachers were judged by master teachers to have average performance in questioning procedures at the beginning and average growth during practice teaching, and (3) that both performance and growth were relatively high in evaluative procedures.

6. That the attention of both staff members and master teachers be called to the relatively weak performance in technical information at both the start and finish of practice teaching. It appears that increased emphasis needs to be placed on preparation for teaching related information.

7. That the attention of instructors of courses in principles and practices in industrial arts be directed to the evidence which tends to show that a simulated teaching situation cannot be expected to develop teaching ability without the real experience of practice teaching. Efforts in principles and practices courses might well be directed toward preparing for practice teaching since much growth in actual teaching takes place naturally and quickly in practice teaching.

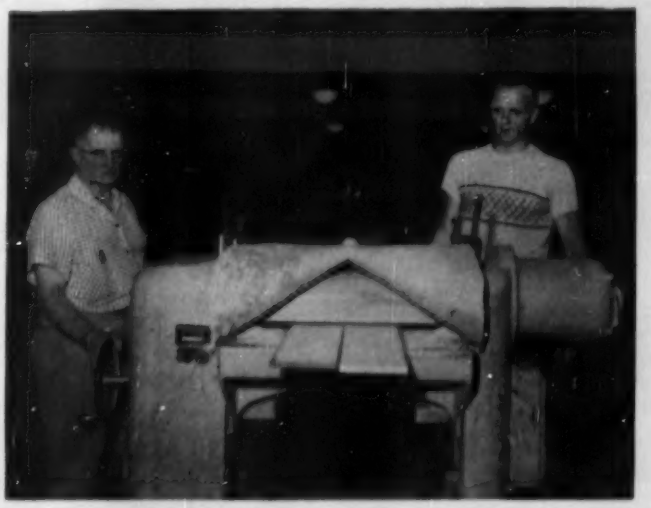
8. That the present arrangement of two nine-week practice teaching periods be justified on other precepts than growth alone.

9. That some type observation, participation and/or practice in teaching be provided in the Freshman and Sophomore years of college.

In the process of conducting this study, certain evidences of the need for additional investigations were discovered. A study might be conducted to discover what other combinations of practice teaching periods would give more experience in adjusting to new situations. Such an investigation might attempt to find the optimum length of time for each practice teaching experience by observing the pattern of growth of student teachers. The evidence of a relatively small amount of growth in the ability to promote student planning led to the idea that an interesting and valuable study would be to determine the degree to which master teachers are in sympathy with this practice.

A study might be conducted to find the effectiveness of pre-practice teaching methods courses in industrial arts. A comparison of the performance of a group of practice teachers, who have had a methods course with a group who have not, might show its effectiveness.

It is hoped that certain data collected in this study will be useful in connection with other research studies now being contemplated within the staff at the State University of New York's Teachers College at Oswego.



Prof. O. J. House, head of industrial arts and trade education at Southern State Teachers College, Springfield, So. Dak., and Howard Hovland, a summer student, devised and made this double funnel attachment for the planer to carry the shavings off to the side. The attachment makes it possible to start a board through the planer and go to the other side and take the board without getting a face full of shavings

— Photograph submitted by W. W. Luderman, Southern State Teachers College, Springfield, So. Dak.

It Is a Worth-While Effort to—

Professionalize Your Undergraduate Shop Courses

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In industrial-arts teacher preparation it might be charged, and rightfully so, that many shop courses are essentially the same as courses taught on the high school level. How is it possible for a college student to receive college credit for a hand woodworking course when, in a high school nearby, the pupil in a similar course is granted only high school credit?

There are no doubt numerous ways to answer this question; however, the writers of this article wish to call attention to one possible solution — the professionalization of shop courses.

Teacher educators influence the manner in which prospective teachers will, at some future date, teach. This influence can either take a positive or a negative direction. Since the college shop teacher finds himself in such an influential position, it is his responsibility to assure that his influence will be in a positive direction.

The acquisition of professional competencies may be advanced by the intelligent planning of the undergraduate shop program. It is not enough that the student learn basic skills and related knowledge. The prospective industrial-arts shop teacher must additionally and concomitantly practice those abilities which will enable him to perform effectively as a teacher in a shop situation.

A. *Developing professional competencies (over and above the acquisition of shop skills and knowledge) through activities included in undergraduate shop and technical courses.*

Competencies *over and above the acquisition of shop skills and knowledge* pertain to the skills which supplement the hand and machine skills, and the technical understanding, in developing shop teachers. Included in this category of competencies are: (1) the ability to give a good demonstration; (2) the writing of instruction sheets; (3) the objective evaluation of pupil progress; as well as other competencies which will serve the prospective teacher in facilitating instruction when he is actually out on the job.

B. *Why should the teacher-educator in the undergraduate shop be concerned about these professional competencies?*

The main function of an industrial-arts program of college grade is to prepare people to teach industrial-arts shop courses at the elementary and secondary school levels. No attempt is claimed by teacher education institutions, to produce highly skilled craftsmen. Rather, claims are made that these colleges and universities develop a reasonable degree of proficiency in hand and machine skills and technical information, coupled with experiences of a professional nature. It is not intended that the time normally allocated to the development of skills and the acquisition of related subject matter be reduced so as to allow for the development of professional competencies. However, these professional competencies should not be neglected, for they too contribute in determining how far the individual will progress in his field. Who can say which individual is more ineffective as a teacher, the craftsman who employs poor teaching techniques, or the person who is able to communicate effectively and has all the teaching skills but who lacks sufficient shop skills and subject matter mastery?

It is true that many phases of a program designed to develop professional competencies can be conducted more advantageously in one or more specialized courses, such as, *methods of teaching industrial arts, problems in industrial arts, or equipment and management.* Under the plan advocated here professional courses will not be replaced; instead they will be greatly supplemented. In fact, the professional competencies developed in shop courses should be co-ordinated with professional courses in order to insure full coverage of subject matter and to prevent undesirable duplication.

To pursue the point a bit further, some teacher educators themselves have been guilty of violating accepted principles of teaching. Often the student is not aware of these violations until he reaches a methods course and by this time he must either *unlearn* these incorrect methods or continue to employ them. In any event he becomes frustrated. Every educator should always employ good teaching techniques and, what is more, he should encourage his students to be aware of his teaching methods.

With such a plan there will be a close correlation between what is taught in professional courses, a methods course for example, and the question of the shop courses. This would tend to eliminate the situation in which the instructor is forced to say "Do not teach the way I teach, but the way you are taught in your methods course."

There are certain definite advantages in introducing some aspects of a professional nature into the typical shop course. For example, the preparation necessary for a successful demonstration requires more intense study and more careful planning than is necessary for merely doing an operation. This gives added motivation; the added motivation definitely should be of interest to the teacher trainer — indeed it is well worth exploring. The designing of a project is another activity which might be used to develop professional competence, for it is a logical forerunner of the making of that object. At least project designing should be required of students who have received their initial orientation into a shop and who are familiar with the materials and tools found in that shop. This natural process of designing

projects prior to their construction has real opportunities in problem solving, critical thinking, and creative expression. The college shop teacher who fails to recognize the value of developing this competence in his students, as prospective shop teachers, is very likely one who is in part responsible for the admittedly low level of design found in the field of industrial education.

These two examples of *professional assignments,* to be carried out in conjunction with the regular shopwork, indicate rather clearly that there is much to be gained when such activities are incorporated into the college shop program. Certainly these experiences give additional meaning and significance to what the student observes in the shop, for he begins to see the *instructional* aspects of various procedures, the problems inherent in the class demonstration, the advantages in the use of instruction sheets and other teaching aids. With this new viewpoint, he is no longer taking just a shop course slightly more advanced than the one he had in high school. He has now begun his professional preparation as an industrial-arts teacher by his efforts to analyze and solve some of the concrete teaching problems found in every shop course.

This does not mean that he should be asked to solve any lengthy instructional problem such as the revising of a course of study or the complete planning of a shop. The assignments required of him should be the beginning rather than the culmination of his professional training and should be consistent with his level of development.

Undoubtedly a question arises as to the time element in a program which provides for these experiences. With a limited amount of time, is it inevitable that shop skills and knowledge will suffer as offerings in the total program? On the contrary, if such a program is conducted wisely, the added motivation and interest should be adequate to maintain previous standards and could possibly raise them still higher. While it is true that the amount of available time does have a bearing on learning, psychologists today are giving increased attention to the study of motivational factors in the learning process. Or in other words are seeking ways of using the available time more profitably. In the light of what has been found to date it is safe to say that skills and knowledge are not lost, if sound judgment is exercised in selecting appropriate professional activities and in assisting students in the class to carry out these activities.

C. What are some of the activities which can be used effectively in developing professional competencies?

The following items should not be considered a complete listing. Likewise, it is not intended that all of the activities that will eventually be listed should be attempted by every class or by every member of a class. Some of the activities, it is felt, should be assigned to every student without exception. Others could be allocated as special research problems to individual students or committees of students.

Certain specific examples of items which might be successfully incorporated in the shop program follow:

Co-operative Planning of Objectives: Today it is generally agreed that when it is possible for the learner to have some voice in the planning of the course which he is just beginning, the possibilities for greater learning are increased. This newer procedure is being used effectively on all levels of education, but it has a double purpose when applied on the teacher-education level, for it not only sets the stage for the course content in a more democratic manner, but also underlines the importance of positive teaching goals.

Performing Demonstrations: The average person seldom has enough real appreciation for a skilled performance whether it be in the work of a carpenter, a stenographer, a bricklayer, or a musician. The skilled person moves so smoothly and so efficiently that the facility with which he performs creates a deceptive impression of the quality and quantity of the effort exerted. It appears that almost anyone could do his work as well as he does. In the undergraduate shop after the students have seen many expert demonstrations by their instructor, they should then tackle the problem of a demonstration of their own. This type of assignment should have several worth-while outcomes: first, the student puts more effort into his study because, although he may not need instructor approval, he needs the approval of the class; second, he begins to develop appreciation for, and insight into, the art of teaching.

Making Teaching Aids: In the matter of designing and constructing teaching aids the student in the undergraduate shop is in a particularly advantageous position. From his firsthand experience in that shop he knows where he and his fellow students have had learning difficulties. Knowing these trouble spots, he can readily see the value of a well-conceived and skillfully made teaching aid. Furthermore, with some simple research and guidance from his instructor, he should be able to develop at least *one* teaching aid which will be worth taking with him when he goes out to teach. In addition, he is exposed to the efforts of other students, from which ideas may emerge for further development.

It is recommended that student-made teaching aids should consist primarily of examples of work made in the shop. For example, a teaching aid in a welding course would be actual specimens of good and bad welding rather than a poster illustrating this phase of instruction.

Professionalization does not require a departure from the subject matter area, rather it can well serve as a reinforcement to that subject matter area. This is a double-barreled approach which combines subject matter mastery with insight into teaching problems.

Designing Projects: It does not take a high degree of discernment to recognize the fact that there has been a revolution in educational thought and practice in the past 60 years. Industrial arts has been, and is today, a vital part of this movement to make education function more effectively in the lives of young people.

Somewhat paralleling the revolution in education has been a revolution in the design of objects made by man — the modern design movement. Many of the forces, which shaped both of these revolutions, are identical: the scientific movement; a desire to put things to use (in education and in art); and the elevation of the common man, to name a few.

It would seem reasonable then, to expect that students in the industrial-arts area should be fairly well versed regarding three recent revolutions — the industrial revolution, the educational revolution, and the revolution in the arts. Beyond the fact that project designing is enjoyable, it helps to develop creativeness, aesthetic judgment, and self-confidence in solving design problems.

Requesting Free and Inexpensive Commercial Booklets and Materials: Professional competencies and attitudes are seen in the industrial-arts teacher out in the field, who is well informed regarding which manufacturers' publications are available and which are of value in a particular teaching situation. Obviously, the time to start becoming familiar with the many excellent printed materials supplied by commercial sources is the time when they will be most helpful — in other words, in the undergraduate shop courses. By the time the student is ready to go out and teach he should have a well-organized and comprehensive assortment of valuable teaching aids in these brochures, samples, instructional charts, and manuals, sent to him by different firms.

Writing Instruction Sheets: In the writing of instruction sheets the student has an opportunity to blend together subject matter proficiency, teaching ability, and skill in writing and drawing. A competent teacher should be able to develop the instruction sheets which his situation requires. Obviously

the student must have a thorough understanding of the subject matter which he includes in an instruction sheet. To have students develop these sheets serves the dual purpose of increasing knowledge in the subject area, and developing the skill required of good teachers in this connection.

Planning and Carrying Out Public Relations Programs: We all recognize the importance of public relations to the industrial-arts program. Public relations color the character of the industrial-arts program by influencing the number and the caliber of students who choose this field. Likewise, it affects the general acceptance of, and subsequently, the financial support for, the program. Many prospective teachers are not aware of their responsibility in the area of public relations. They can, however, be made aware that they must take the lead in this area by assigning them leadership roles in preparing exhibits, bulletin boards, and the like. Every shop instructor should give serious consideration to the aspects of public relations which are inherent in his shop situation.

Evaluation: The area of evaluation is one which is difficult for many experienced teachers and especially so, for inexperienced teachers. Many activities occur in the shop from time to time that lend themselves perfectly to the development of competencies in this area. When the prospective teacher gives a demonstration, if his fellow students evaluate his performance, he becomes more critical of himself in anticipation of their evaluation. Likewise they would, as result of this experience, become more objective in their evaluation. Mastery of subject matter can be judged to some extent by the nature of test questions devised by students. Furthermore, skill in this area will be of unlimited value to the prospective teacher. Because evaluation is important, both from the standpoint of rating pupils and improving instruction, much attention should be given to this area.

To sum up this matter of evaluation, there is nothing that would indicate that prospective industrial-arts teachers should always be on the *receiving end* of tests and other evaluating devices. Why not capitalize on the benefits to be derived when they gain some insight into evaluation procedures.

Why not capitalize on the many opportunities which are always present in which the student can gain greater insight into evaluation procedures. Understanding can come through the devising of test questions, the planning of rating scales, the developing of criteria for judging shop projects, and the developing of criteria for determining final grades.

Undoubtedly other professionalizing activities could be added to this listing. Indeed it has not been the intention of the writers to exhaust the various possibilities for incorporating this type of emphasis into the college shop program. No doubt many teacher-educators throughout the country have employed some or all of the techniques advocated here and are well aware of the over-all value of this approach. From the experience of the writers and from the experiences of teacher-educators who have *professionalized* their shop courses, it can be said that this plan definitely enriches the value of the shop program in the total education of the shop teacher.

Opinions Gathered From Various Sources—

Interviews on Industrial Arts in the Elementary School

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Twelve people of different occupations were interviewed on the advisability of giving training in industrial arts in the elementary grades. Their opinions were recorded on a questionnaire form similar to the following, a transcript of each interview is given below.

Questionnaire

Name .....
Occupation .....

1. *Who* should receive industrial-arts training? Sex..... Age.....
2. *How* should it be taught? (Method of teaching) .....
3. *What* types and variety of works? Skills..... Results.....
4. *Where* should it be taught? Shop.... classroom....
5. *When* should it be taught? What time?..... Amount of time.....
6. *Why* should such training be given? (Reasons for work).....

The answers given to these questions are recorded in the following interviews.

First Grade Teacher

Industrial-arts work should be compulsory for both boys and girls in the lower school, and for boys in the upper school.

Creative work is important in the lower grades; a degree of accuracy will grow out of need.

Most of the time should be spent in actual processes, and these processes should vary with the different individuals.

Work should depend upon the child. It should not be too difficult at first, and should gradually change, the work varying with the individual.

Elementary industrial arts should be carried on in the shop and the classroom. Situations depend upon the needs of the students and the ability of the shop and the classroom teachers.

Any time of the day is satisfactory for the work. The periods should de-

pend upon the time available, which should be very flexible.

Fifth Grade Teacher

Ordinarily all people from kindergarten up should have industrial arts. The work in grades up to the third or fourth could be done in the classroom, and from the fourth up, the work should be under the direction of a shop teacher.

A shop should be provided and equipped in every school. Every type of work of benefit to the individual should be given, and group activity would depend upon the group.

The goal should be the child more than the project. At least two hours per week should be devoted to this activity.

Some good reasons for this work would be: prevocational, vocational, recreational, and to give the children something tangible to do.

Seventh Grade Teacher

Both boys and girls from the fourth grade up should be given instruction in industrial arts.

The upper school should have their work in a regular shop. All types of work should be given.

An hour and one half in the late afternoon should be given over to this type of work.

Some worth-while outcomes would be: to give classroom teachers more time to help individuals, and to promote leisure time activities and co-ordination of the individual.

Teacher of English and Social Studies in the Upper Elementary Schools

A type of elementary industrial arts should begin in the third grade and be given to boys and girls together. Later on, the boys and girls should be separated, with the boys taking wood, metal, and electricity, and the girls taking leather, paper work, and weaving.

The program should be elastic, with a minimum of two 45-minute periods a week for this work.

In this work, skills should be developed, an opportunity presented for certain interests to be aroused, and training should be given in the solution of problems. Also a teacher specifically trained for this work should be provided.

Teacher of Elementary Industrial Arts

All boys and girls from the first grade through the sixth should be given elementary industrial arts together.

The work should consist of individual projects as well as integrated work.

As many different types of work as possible which have value and are within the ability of the student should be provided.

The work should be done in the shop or classroom, depending upon the type of work.

From two to four hours a week should be given over to this type of work. This work should be given to assist in the process of general education and to provide for service skills, recreation, exploration, expression, leisure time activities, diversion, etc.

Assistant Principal

The boys of the elementary school should have compulsory industrial arts, and the girls voluntary.

All should make practical, useful things, have a chance for creating, learn things to help in adult life, and develop practical skills. Learn by doing — and, of course, the work should be constructed around the pupil.

Stimulating problems should be used, and the individual should be taught how to face problems — problems which are well chosen and not too easy. These should be talked over with each class.

There should be a carry-over to things outside of school, classroom, and shop. There should be leisure time activities, interesting at all times.

It is well to use different techniques of teaching on various projects; periods should be as long as a child can stand them; classes should be fitted to time schedule, according to groups.

School Librarian

This librarian believes that all boys and girls, in mixed groups from the third grade up, should have industrial-arts work. She further believes that it would be a serious mistake to separate the boys and girls.

She believes large scale related work to be of no consequence, but some type of permanent work related to classroom activities would prove advantageous. Everybody should not be expected to do the same things, but each should be given a suggested list to work from for that age and grade level. Use activities that will promote transfer of training. Arts was felt to help along this point. Certain service skills that are necessary to what is being done should be mastered immediately.

The ideal situation would be to have a shop equipped for industrial arts. In the event that this cannot be provided, have as much of a program as possible, and try to build up to the complete setup.

Small children should have but a short time for work, while older children should have a longer work period.

Some of our aims should be the correct use of tools, physical education values, co-ordination of mind and body, dexterity, ability to work with others, and a feeling of satisfaction in success.

Janitor-Custodian

Boys from the fifth grade up should be given wood, metal, and electricity, while the girls should have basketry, weaving, and clay.

Three hours a week should be given both boys and girls; each person should be allowed to make what he likes.

Shops and special rooms, especially equipped, should be furnished for this type of work. Each person should be expected to know "service skills," but these skills will, of course, be different for boys and girls.

Electrical Engineer

All people, boys and girls together, after about ten years of age, should have some form of shopwork. There should be a combination of methods in teaching, and the method that would give the best result at the time should be used.

It is essential that we have a variety of work, but the work should not be complicated.

Each person definitely should learn the skills for what he is doing. Each child's work should be built upon what he knows and retains from the past.

Industrial-arts work should be taught in a shop with an instructor. If possible, the morning should be used for this type of work, with about one and one-half to two hours per week being given to it.

Some of the objectives should be to develop mechanical skills and to provide occupational guidance and diversion from other schoolwork and everyday activities.

Housewife

Everybody that has an urge or desire to do so should be given elementary industrial-arts after he is eight years old.

A special teacher should be hired to give this type of work properly.

The boys should be given an opportunity in wood, metal, and electricity, and the girls in leather, clay, and weaving.

It is important for all people to know how to do things and make things for themselves.

A shop should be provided for this type of work. Both boys and girls should have the same amount of time. The morning is preferred for this type of work, and the periods should not be too long.

These people should be taught *service skills* — how to do home repair work, and to do a great variety of things.

Housewife

Work of an educational, manipulative nature should be started in the third grade with boys and girls working together until the sixth grade when they should be separated.

The shop should be available to both

boys and girls, and all types of activities should be provided including relief maps, drawing, illustrations, and clay modeling.

Older boys should work at carpentry, cabinetmaking, and wrought iron work. Older girls should work at weaving, ceramics, sewing, and cooking.

Elementary industrial arts should be carried on with the regular teacher and the shop teacher co-operating, with special shop equipment and materials provided.

An attempt should be made to develop originality, a sense of satisfaction, and better ability to work with the hands.

Clerk

A type of industrial arts should be given to all boys and girls from the seventh grade up.

People have certain talents and should be given a chance to exercise them. A special teacher, shop equipment, and materials should be provided for this work.

For the most part the school should provide the materials, but if the work is large and expensive, the student should pay part of it.

The size of shop classes should be based upon other classes; industrial arts should be given the same amount of time as any other subject.

Summary

Summarizing, we may say that from the content of this series of interviews, it is apparent that both teachers and people from other occupations consider that a practical type of industrial-arts manipulative work is necessary to the complete development and education of both boys and girls in the elementary schools; and that a variety of practical industrial-arts work was considered extremely important for all boys of the upper elementary school age in particular. There is some difference of opinion as to the age at which the training should commence, but it is the consensus of opinion that a well-equipped shop and a trained shop teacher should be provided, and that industrial-arts training in the lower grades will definitely contribute greatly to the realization of the objectives of the "seven cardinal principles of education."

A Much Discussed Question

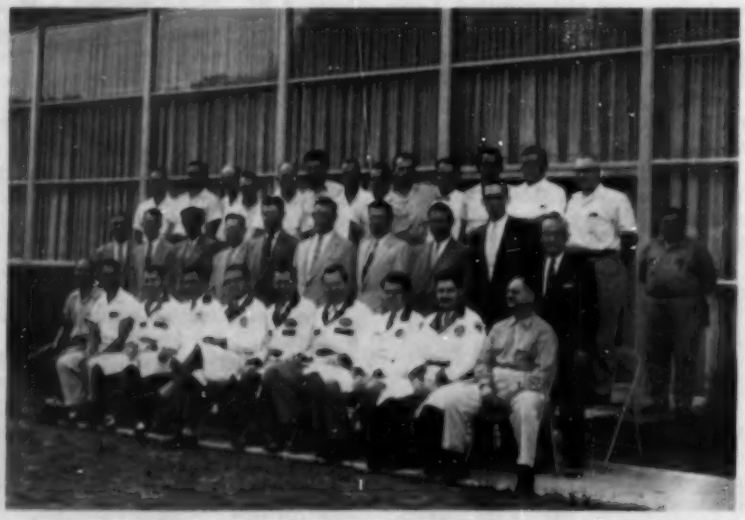
College Credit for Workshop Courses

WALTER J. ROBINSON
Professor, Industrial Education
Northwestern State College
Natchitoches, La.

Offering college credit for courses which do not adhere to the traditional college pattern may be frowned upon by the academician. Some will even advocate eliminating from the college program all type of courses which deviate from the liberal arts concept of an education. Selection and organization of subject matter as practiced at the turn of the century certainly do not coincide with present-day conditions. This is particularly true as it applies to vocational education. Framers of the George-Barden Act were cognizant of this fact when they wrote provisions into the Bill for offering vocational courses for less than the 144 hours as specified in the Smith-Hughes Act. If teacher-education institutions are to be leaders in the field of teacher education it becomes necessary that provision be made for them to meet the needs of their clientele.

The vocational-industrial program in Louisiana is somewhat different from that found in most of the states in that practically all instruction is centered in 24-area trade schools which operate on a 12-month basis. Consequently, no time is available for instructors to spend in industry or in college for the purpose of upgrading themselves, with the exception of their two-week annual vacation. Recognizing the difficulties the instructors are encountering, Northwestern State College inaugurated as a part of its regular industrial education program the short intensive course commonly called the workshop.

The third annual itinerant workshop was conducted by the department dur-



Vocational-industrial automobile instructors from Louisiana trade schools, and the General Motors instructors at the New Orleans Training Center

— Photograph, Leon Trice, New Orleans, La.

ing the week of June 7, 1954. Equipment and trained technicians for the course were furnished by divisions of General Motors Corporation. The Cadillac Division demonstrated use and servicing of power steering; Pontiac had charge of hydramatic transmission; Delco-Remy, automotive electricity; and Sun Electric, diagnosis and testing.

As a result of General Motors locating training centers for their dealer's mechanics strategically over the nation, the itinerant type workshop has been discontinued, in favor of the training center. At the official dedication of their new center in New Orleans in January, 1955, arrangements were completed for setting up Northwestern's fourth annual workshop for the automobile instructors in Louisiana's vocational schools. Classes for all General Motors' dealer mechanics were scheduled around the two weeks period from June 6 to June 18, and that period set aside for the workshop schedule. By means of an informal survey made on the instructors in the state concerning their needs and special interests, the following areas in automotive instruction were agreed upon; hydramatic and power glide transmission, power brakes and power steering, engine overhaul, electrical and fuel systems.

All equipment and instructor personnel were furnished by General Motors free of charge to the department. Instructors for the workshop were the regular faculty members who are assigned on a permanent basis by General Motors to that center. They are specialists not only in the *What To Teach*, but also *How To Teach*. The courses were well organized and each phase of instruction was supplemented with visual aids, mock-ups, and the actual part of the automobile upon which instruction was being given. Laboratory work constituted about three fourths of the course work. Six work stations, in each unit, were adequately equipped with scientific testing equipment. Consequently, the maximum enrollment in any group was six students which permitted the greater amount of the instruction to be on an individual basis.

Each instructor prepared an objective examination over his unit which was combined with other units to constitute a *final* examination. The examination was given at the last session. Test scores were evaluated, grades assigned and credit recorded for the student on his college record. Twenty clock hours of instruction were used as a basis for each semester hour.

Vocational-industrial instructors who have attended the workshops are enthusiastic over the results obtained. They are able to return to their shops and reorganize their instructional material and methods in line with some of the latest developments in the industrial field. The following statements made by some of the instructors who were enrolled in the workshop courses are typical of each instructor's reaction:

This training center is one of the best I have attended and I believe this is what all instructors need.

I would like to attend the automotive electrical class if these classes are offered next summer.

The training and the training facilities of this school are far above any other I have been a part of.

There are no words to express my thanks and appreciation for this kind of training, and much needed instruction for people employed in the trade schools throughout the state.

It has really been an inspiration to me to have had this course under the very effective and efficient instructors.

I have been to quite a few different schools and colleges and as a comparison I can truthfully say that this G.M. Training Center cannot be equaled.

I would really welcome the chance to attend some more of the classes here in the automotive field.

I have enjoyed this week at G. M. I think it is a nice place for us to get the kind of instruction that we need. I would like to see it kept going. It is the very thing I need to keep up with the changing of time.

I have just completed my second week at the G. M. Training Center. I think I have received the most superb training that could have been obtained anywhere.

The manager and instructors have been most co-operative. I don't think it could be improved as far as working conditions and instructions for the advanced training we received here.

I hope to get a chance to come back next summer for more training.

I think that there is little room for improvement in the present setup at this school. The material used here seems to be some of the best but the one thing that seems to be the most outstanding is the type of instruction that I received. All of the best equipment would be of little value without the type of instructors that are here. Being an instructor myself, I can appreciate these highly trained men.

In view of the results obtained from these short courses, plans are being made for another workshop during the summer of 1956 at the New Orleans Center.

Recognizing Individual Differences —

Individualizing Assignments Through Differentiated Contracts

R. D. GOFF
Corvallis High School
Corvallis, Ore.

The expression, "provide for individual differences," is frequently heard in summer session classes, and occurs in most philosophical articles. One is often confronted by the implication that something special is being, or should be done. Practically no real suggestions are available in current literature. Undoubtedly many teachers are working with the problem, but have not taken the time to write it up and present their work for the consideration of other teachers.

In this article, the writer presents an introduction to a teaching plan that provides an approach to the preparation of assignments in accordance with the learning potential of individual students. It is called a *Differentiated Contract Plan*. The plan, as presented, has evolved from twenty some years of experimentation and research carried on while teaching full time. It is the result of a sincere belief that it should be possible in an industrial-arts shop to offer unlimited opportunities for the *gifted*, and satisfaction in achievement for the *slow* student. Continued effort on the plan has been sustained by the challenge inherent in the problem, and by experiencing gratifying results.

A *Differentiated Contract* is merely an ordinary assignment except as indicated in the following. (1) The assignment is prepared to provide for a range of ability levels. The aim is to provide each student with a personalized problem. (2) The student participates in determining his problem. In doing this he commits himself to his own assignment. (3) The student understands the relative grade value of the problem as specified by the contract. He knows the *price* he must pay. He can expect satisfactory performance, for the *B* requirements, to earn a grade of a B. (4) The

assignment is based upon specified instruction units which may be learned through work on approved individually chosen construction problems. These problems present a variety of articles that provided learning experiences through the *Cylindrical Sheet Metal Contract*.

Differentiated Contracts are used because: (1) The plan readily provides for student participation in assignment planning. It provides a flexibility and yet assures a controlable teaching situation. (2) The plan provides for ability levels. Through standardized achievement test results we have learned that the performance level of students commonly ranges from three grades below, to three above the actual grade level. Intelligence test results commonly show an I.Q. range of 75 to 140 in one class. Any teacher with experience readily observes a comparable spread in manipulative ability. (3) The *differentiated contract* provides an opportunity to revive an interest in learning through jobs which can be handled successfully. Too many high school students are being *carried along* in their classes. Some know their efforts are below the established standards but are being given passing grades because they have tried. Too many have realized this for so long they have given up and do not even try. (4) The plan permits assignments that will challenge the *gifted*. Too many high school students have learned to *get by* with the least effort possible. The gifted student may be the worst offender. We need to conserve our most valuable resources. (5) The plan contributes to individual and class morale through anticipation of success on problems that present an appropriate challenge. (6) All students may realize satisfaction in accomplishment. (7) Use of the plan provides a stimulating challenge for the instructor. Has the contract produced results that are comparable to the apparent individual potential?

A Differentiated Contract

Figure 1 shows a typical differentiated contract. The contract sheet comprises three parts: (*a*) heading with provision for signatures, time record, and evaluation; (*b*) manipulative work requirements; (*c*) information work requirements. Refer to the *Procedure Plan* section for an explanation of the working-time factor. An explanation of evaluation procedures will be presented in a future article dealing with administration of the plan.

Differentiation is rather general in the manipulative area. For the *C* and *D* levels a specific problem is offered. The *D* requirements are offered as a means of providing satisfaction primarily from construction. Most students find sufficient challenge in the *C* requirements. The *A* and *B* requirements are offered as a challenge to the capable and ambitious student.

A student may choose different levels of difficulty in the manipulative and information areas. This permits him to benefit by his stronger abilities, and to favor but not neglect his weaker ones.

The information area of the contract provides for more specific differentiation. Much effort has been expended in trying to establish assignments that would be appropriate for the *gifted* students. This is supported by a deep-seated belief. Success on the future jobs held by students will not be from the use of *canned answers* given by the teachers of *today*. Success will more likely be the result of the worker being able to identify a problem, analyze it, survey the findings, and propose a working solution. In the commitments for *Information Work Required* the writer attempts to present problems which can challenge all students. This is largely done through the use of a study guide shown in Figure 2.

Study Guide

The study guide is designed to provide specific assignments for four difficulty levels. The problems rated as *D* are designed for the student who learns slowly through reading. These students are provided an opportunity to feel the satisfaction of successfully completing the assignment. The *C* and *B* problems are progressively more difficult. Satisfactory answers are available from the text, but require more thorough reading and understanding than for the *D* problems. The *A* problems are designed to challenge the *best* students. Satisfactory answers to the *C* and *D* problems can usually be copied from the text. Solutions for the *A* problems should require study beyond the limits of the text.

Procedure Plan

The procedure plan serves as a guide for the student as progress is made with the construction work. When appropriate, they are developed through class discussion. See Figure 3. It also provides an example for students in preparing their own plans for articles of their own choice. In addition to serving as a construction guide, it provides a time-factor guide. The first column of figures indicates, in periods, how much work should be accomplished by intervals of one or two working periods. The writer is very aware of the amount of *time wasting* which can occur in school shops.

A total of ten *working periods* is allowed for making the drawing and building the sugar scoop (R. E. Smith, "Units in Sheetmetal Work," page 71). Time extensions are allowed when justifiable from an educational point of view. Extensions are allowed for work done in correcting mistakes, and as needed, for those catastrophies which necessitate starting over. School is a learning situation. Mistakes provide a very positive learning situation.

Required and Elective Contracts

Eighteen contracts are now used by the writer in teaching general metalwork on three school experience levels. These provide basic learning experiences in eight activity areas of the general metals program at Corvallis High School, Corvallis, Ore. Two bench- and sheet-metal contracts are required during the first year of work. One required contract is used to start each year of advanced work. Choices may be made from the other 12 teacher-developed contracts after completion of the required work.

Many contracts are developed by the students for individually chosen projects. These contain shop and information requirements similar to the standard contracts. Written reports are made if suitable study guide material is not available. An *Elective Contract Guide Sheet* is used by the students as they draw up their own contracts.

Some teachers, in observing the operation of the plan, have said that it seems to operate almost automatically. That is not the truth. Others have criticized the plan because it requires records and *paper work*. The writer continues to use the plan because he believes it provides better opportunity for individual development and self-realization, and yet provides for maintaining a teachable situation.

Cylindrical Sheet-Metal Contract

Corvallis High School — General Metal Shop

Contract approval..... Period.....
Name .....
Date started ..... Date finished .....
Estimated working time .... Point evaluation
Shopwork ....
Information work ...
Periods of extension ....
Total working time ....

Many sheet-metal articles have cylindrical shape. This assignment is designed to acquaint you with some of the problems in laying out and making such articles. A wide choice of articles is available, but the one chosen must provide the required experiences and have the instructor's approval.

Shopwork Required

D Contract

..... Construct a cylindrical scoop, using a pattern. Estimated time — 7 periods.

C Contract

.....1. Draw the views and pattern for a sugar scoop. Text — page 72.
.....2. Make the scoop. Estimated time — 10 periods.

A and B Contract

.....1. Make the drawing and pattern development for an assigned T intersection, or other approved article.
.....2. Make the article. Workmanship must be of high quality. Time estimation to be determined.

*** Information Work Required**

D Contract

.....1. Study and be able to follow the procedure plan.
.....2. Answer the *D* problems on the study guide.
.....3. Earn a satisfactory test grade.

C Contract

.....1. Prepare a list of all tools, materials, and equipment used. Be ready to help others follow the procedure plan.
.....2. Answer the *C* and *D* study-guide problems.
.....3. Earn a *D* or better on the test.

B Contract

.....1. Prepare your own procedure plan if needed.
.....2. Answer the *B* and *C* study-guide problems.
.....3. Earn a *C* or better on the test.

A Contract

.....1. Prepare your own procedure plan.
.....2. Answer the *A* study-guide problems.
.....3. Earn a *B* or better on the test.
.....4. Check study-guide work of one or two students as assigned. .....,
.....

Figure 1

Cylindrical Contract Study Guide

Prepare essay type answers to the following problems as required by your contract. Refer to the following: Smith, "Units in Sheet-metal Work"; Units 2–5, 16–22, Table I.

A— 1. Assume you ordered a sheet of 16G copper, and received material .0508 in. thick instead of .065 in. What mistake was made by you?
D— 2. Name five commonly used kinds of sheet metal.
C— 3. How much would a 24 by 48-in. sheet of 21-gauge (Stubs) copper weigh?
B— 4. Explain in detail how to adjust the gripping jaws of a bar folder.
A— 5. Explain why 12 divisions would be unsatisfactory for making a cylindrical layout on a 30-in. diameter.
B— 6. Why should one heat a soldering iron to its maximum heat for most soldering jobs?
D— 7. What is alloy sheet steel?
C— 8. Give three safety rules for operating the squaring shears.
B— 9. What element could be alloyed with steel to reduce oxidation?
A—10. When sweat soldering a copper planter, how could you keep the solder from flowing out where it would show?
C—11. Why is the side view of the scoop divided into 12 equal sections when making the drawing for a pattern development?
D—12. What is galvanized iron?
B—13. If a high degree of accuracy is necessary, how should the length of the cylindrical layout be determined?

(*Explanatory note*): The material above is typical of the content of the study-guide sheets used with the contracts. Approximately 30 questions or problems are used with a contract of this size.

Figure 2

Cylindrical Contract Procedure Plan

A. Drawing and pattern development. *Omitted by D contract students.* This work must be done with instruments which will assure reasonable accuracy.
1. Block out the front and side views of the scoop body.
2. Draw the contour (shape) of the body freehand.
3. Draw the handle. Approval .....
1 4. Line in the drawing and place the necessary dimensions.
5. Divide the side view into 12 equal divisions. Use 30–60 degree triangle.
6. Project these points across the front view.
7. Determine the circumference of the cylinder. (3.14 × Dia.)
8. Draw a line that will be the end of the body pattern.
1 9. Layout the true length of the body and divide it into 12 equal parts. Approval .....
10. Draw lines perpendicular to the 12 section marks.
11. Transfer the actual length of the section marks from the front view to the corresponding marks on the pattern development (like a box with 12 sides).
12. Draw in the pattern shape. Approval .....
13. Draw the scoop end with 3/32 in. allowed for the bur.
1 14. Draw the handle.

B. Scoop construction.
1. Secure material for the body.
2. Transfer the pattern development by means of scribe pricks.
1 3. Scribe the straight line with a straightedge, and the curved part freehand. Allow an extra ½ in. at each end for making the grooved seam. Approval .....
4. Cut out the body. *Do not cut off seam stock.*
5. Using scrap stock, adjust the bar folder so the proper amount is folded to form the grooved seam.
1 6. Determine the amount of metal needed to make the seam.
7. Lay out and cut the seam stock to the proper length.
8. Fold the stock for the seam.
1 9. Bend the body and make the grooved seam. Solder by flame on the inside. Stamp your number on the seam. Approval .....
10. Correct the bend as needed to make the end flat.
11. Lay out and cut the stock for the end.
2 12. Burr the edge and solder it to the body (hand procedure). Approval .....
13. Lay out and cut out the handle.
14. Make the hems and bend the handle.
15. Solder the handle to the body (sweat solder).
2 16. Clean up and turn in for evaluation.

Time extensions:
1. .....
Approved .....

Figure 3

ELIMINATING STANDING TYPE FORMS

DAVID CARL GOLDSTEIN
Teacher of Printing
Alice Deal Junior High School
Washington, D. C.

In the printing and graphic-arts shops there are frequently tie-ups of foundry-type jobs, prepared for faculty associates or school officers, which are stored in anticipation of future re-runs.

The amount of printing material thus removed from circulation is beyond belief. It includes not only type but leads, slugs, spaces, and quads, cuts, and often wood and metal furniture.

I have resolved this difficulty by maintaining a file which contains a sample of every standing form. These are grouped under the heading of the particular individual who requested them. This file is reviewed at least once a semester and more often when possible.

This is done with the faculty member who initiated the form. A dual accomplishment is secured hereby. Not only does this encourage the killing of forms which will not be repeated; it also enables me to discuss the technical aspects of the form with its originator. This has often resulted in an improved, more effective, and more attractive piece of work emanating from the shop.

Incidentally, it has created a greater understanding and appreciation of the graphic arts and inculcated an aroused curiosity concerning its educational possibilities on the part of an otherwise apathetic and disinterested faculty. By so doing, a real educational service was being performed.

SCIENCE FELLOWSHIPS

A national competition for fellowships for high school teachers of chemistry, physics, and biology throughout the United States to attend a special program at the Massachusetts Institute of Technology during the summer of 1956 was announced by M.I.T. recently.

This year's fellowship winners will attend a six-week program of study at M.I.T. from Monday, July 2 through Friday, August 10.

Applications for Westinghouse Fellowships for the 1956 Science Teachers' Program will be considered only from experienced high school and preparatory school teachers of science who hold college degrees or who have had substantially equivalent training and background.

Further information on the Science Teachers' program and application blanks for the Westinghouse Fellowships may be obtained from the Summer Session Office, Room 7–103, Massachusetts Institute of Technology, Cambridge 39. All such applications must be filed by April 1, 1956.

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

AUTOMATION GOING ABROAD

RECENTLY the Minneapolis-Honeywell Regulator Company announced plans for the establishment of a technical training school in England for training engineers and technical personnel in the use of automatic control equipment used in the United States.

This is believed to be the first full-time training school set up abroad by an American manufacturer.

Classes for the first year will be for Minneapolis-Honeywell personnel from Great Britain, Holland, Switzerland, Sweden, Belgium, and Germany. Customer students from Great Britain and Western European firms also will be taken care of later on.

Harry Horton, an English member of the Minneapolis-Honeywell subsidiary in Great Britain, the Honeywell-Brown Ltd., whose background is sales and service, will be the director of the school. He is a graduate electrical engineer, and a member of the Institute of Electrical Engineers and the Society of Instrument Technology in Great Britain.

The school is patterned after the Minneapolis-Honeywell industrial training school in Philadelphia. It is in this way that America exports its industrial development for the good of other countries. Quite different from Russia which relies on an iron curtain and personally conducted tours of foreigners, who, by some hook or crook, get permission to enter communist countries.

PRE-ENGINEERING SUMMER COURSE

THE College of Engineering at New York University launched a new experiment in engineering education when it opened a five-week "pre-engineering" summer session in 1954.

Engineering courses are all based heavily on mathematics and science, and both of these subjects have been watered down considerably since high school enrollments have risen beyond all previous records. The pace in engineering studies is quite fast from the very beginning and a five-week preparation course will help many applicants who have failed to realize in their high school courses how important mathematics and science are if they want to take up engineering.

It is hoped that other universities will take up this practice because weakness of preparation is the cause of many students leaving the universities during the first year of their attendance.

No college credit is to be given, of course, for the studies offered during this pre-engineering course. The objectives of the program are:

1. Better preparation for engineering freshmen for adjustment to their college careers.
2. Give help to those whose entrance grades are mediocre.
3. Give special help to those who are not certain of their ability to pursue, or their interest in engineering mathematics and sciences.

This summer course also will help the students to acquire good study habits; give them a sound basis in engineering drawing, pre-engineering algebra, and backgrounds of physics; an understanding of what the various engineering curriculum offer; and what they demand of the student.

TRAFFIC SAFETY EDITORIAL

THE year 1955 has just ended and its Christmas holidays, as far as auto accidents and fatalities are concerned, should make us hang our heads in shame. The death toll was higher than ever.

While 1954 saw a slight decrease in the nation's automobile accident toll, nearly two million casualties were recorded.

Even with the slight improvement over the more than two million reported in 1953, the results are staggering.

The Travelers Insurance Companies of Hartford, Conn., report 35,500 persons killed and 1,960,000 injured in 1954. Excessive speed was the most dangerous driving mistake in 1954. Speed killed 12,380 people and injured more than 659,000.

Week-end crashes accounted for 13,980 killed and 678,000 hurt during 1954. Thirty-nine per cent of the deaths and 35 per cent of the injuries occurred on Saturdays and Sundays that year.

Three out of four auto accidents happened to passenger cars driving in clear weather on dry roads, and 78 per cent of vehicles in fatal accidents were traveling straight ahead.

These are grim statistics. The 1955 record will be little if any better. The above figures point out that accidents are heavy, even though state and community authorities have spent millions of dollars in an effort to provide safer and better roads and saner driving.

Insurance companies and other private firms are spending millions for safety education. State, county, local, and parkway police are constantly patrolling streets and highways. More and better engineered throughways are coming off the drawing boards. It appears to us that almost everyone is concerned with this needless slaughter and its accompanying waste of human and property values.

Almost everyone, that is, but the drivers.

Traffic regulations were set up as a proper guide for the handling of traffic, and need the co-operation of all drivers. The problem starts and could ideally end with the drivers. Who are the drivers?

Each one of us knows the answer to that question. It is sincerely hoped that by increasing the safe driving courses in our high schools, and by continually reminding drivers of safe driving through newspaper messages, television, radio, and literature, that traffic accidents will be reduced in 1956. It can be done. We are the drivers and it is up to us to see that it will be *done!*

THE SEMESTER'S END EXAMINATION

THE second semester of the school year 1955–56 is rapidly approaching. Have you done something about the final test to be given your students before they leave you. There are numerous tests for all kinds of shop tests in the past issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

Permitting the students to go without being tested may be satisfactory for some instructors, but most teachers will not be satisfied without having some indication of how successful they have been, and how much their students have learned.

Some teachers still adhere to the essay type examination question. Even this, subjective as it may be, is better than no examination at all. However the objective type of test statements are easier to check and are more readily given to the students.

Be sure to be prepared when the present semester ends to give your students a final examination, and have testing periods, properly spaced, throughout the school year.

A Vocational Teacher's Credo*

HILARIO G. NUDAS
Principal, Rodriguez Vocational High School
Manila, Philippines

1. **I BELIEVE** that labor and education are compatible; the first, supplying the raw and dynamic force, the second, the needed vitality and restraint.
2. **I BELIEVE** that the present has its slaves of labor; those who work long and hard and still starve, and those who are square pegs in round holes.
3. **I BELIEVE** that the basic element of citizenship is the ability to earn an honest and adequate livelihood; and that, for many, the vocational school is the most effective agency for training in good citizenship.
4. **I BELIEVE** that one subject matter is as good as any other in training man to think, mathematics or English poorly taught being no better than poorly taught carpentry.
5. **I BELIEVE** that white collar workers are not necessarily superior to those who work in overalls.
6. **I BELIEVE** that in education and not in force lies the survival of democracy; that the heart, the mind, and the hand need harmonious training and education.
7. **I BELIEVE** in the eventual achievement of dignity and freedom for the vocational man: freedom from an inferiority complex, freedom from want, and freedom from being subjected to outmoded and stereotyped instructional procedures.
8. **I BELIEVE** that the facets of wisdom have been preserved and given luster through the ages not alone by the feeling heart, the reasoning mind, nor by the laboring hand, but through the synchronization of all of these.
9. **I BELIEVE** that causes always have effects; thus, labor unrest is produced by capitalistic imperialists; the rich that grow richer are the cause of the poor that become poorer.
10. **I BELIEVE**, finally, that all God-fearing, peaceful and freedom-loving people look to us for hope and salvation from the evils of Communism; that they seek aid from the United States – U. S. which stands for useful service made possible by its dynamic, assertive, and creative men and women who have been vocationally trained to think and work.

*Written while the author attended The Stout State College as pensionado of the Philippines.

Problems and Projects

A NEW TYPE OF LAMP

IRVIN LATHROP
Iowa State College
Ames, Iowa

Cypress knees can be made into very attractive table lamps with a minimum of work.

Select a knee that is straight and about 18 in. long. If the wood is not fairly straight it will be too hard to drill the hole for the lamp cord.

Put a finish on the wood by repeated coats of a good grade of paste wax and buffing. Since the cypress is usually pretty uneven a buffing wheel is a must.

Square off the bottom, by sawing off a small portion of the bottom with a backsaw. The sawing will probably have to be done freehand as there is no flat side from which to start.

Now drill a hole from the top to the bottom for the lamp cord. Drill a ½-in. hole upward from the bottom as far as an ordinary wood bit will go. Then drill down from the top with a long auger bit until the two holes meet. Drilling must be done with extreme care because in places the bit will come close to the side of the wood.

A new type of lamp by Irvin Lathrop

When the top is finished, you are ready to make the base. This is made from maple or birch as these woods take on a light finish that closely resembles the color of the cypress. The base may be made any pleasing shape, but free form looks very nice with this type of project.

The base is sawed out on the band saw, then finished. The base for the lamp described in this article was given two coats of gym seal and waxed. It made a pleasing looking base that blended well with the top of the lamp.

Drill four holes through the base for the screws that fasten it to the top. Drill a larger hole in the base to line up with the hole drilled through the top for the lamp cord. Now fasten the base to the cypress with 1½-in. wood screws.

A small piece of brass pipe is screwed into the top of the cypress on which the light socket is fastened. Pull the cord through the lamp and out at the base. Fasten the light socket to the cord and the lamp is finished.

Add a suitable lamp shade and you have an attractive table lamp.

DISK SANDER DUST CATCHER

OWEN G. PARSONS
Instructor of Industrial Arts
Perth Central School
Amsterdam, N. Y.

The average industrial-arts general shop is the ideal spot for a disk sander. It is a medium priced machine and the abrasive disks and upkeep are well within the budget of even the smallest shop. A disk sander provides an opportunity for the student to use a power abrasive machine and it is a machine that even the youngest shop students can use safely.

However, the amount of dust that can be thrown into the air in just ordinary general shop use is often more than two cupfuls a day. This amount would at least double and possibly triple if there were several woodworking classes. The instructor can quickly see the bad effect of such large quantities of dust on finishes as well as on the health of the student. This is possibly one reason why instructors do not care more for the disk sander.

The problem is one of removing the dust if a disk sander is to be of value. There are several commercial vacuums on the market. Some of these are built to fit disk sanders of the size that could be used in the school shop. The fact that these vacuums cost more than the disk sander, often place them out of reach of the small shop budget. This may be another reason why some instructors shy away from the disk sander.

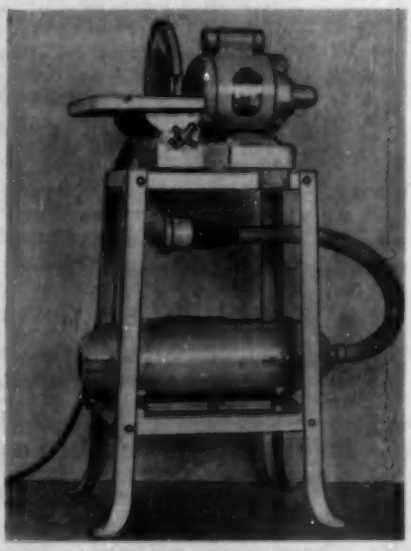
There is a solution to the problem. The solution is a household tank type vacuum sweeper. The one that was purchased to operate on a 12-in. disk sander was secondhand, in good condition and came complete with hose for ten dollars.

Most disk sanders are available with an extension that allows them to be connected with a large type hose to a commercial vacuum. This attachment was purchased with our sander, and can be seen sticking down from the sanding disk in the photograph. The hose of the tank type vacuum cleaner was cut to a length to make a smooth curve from this attachment to the cleaner fastened to the stand shelf.

The connection between the large opening in the attachment and the smaller cleaner hose has been in operation for months and has done a very satisfactory job. It has been wrapped with black tape to make it show up in the photo. The actual connection consists of several layers of paper towels wrapped with friction tape. This produces a springy, yet airtight connection that can be pulled out when the end of the vacuum is removed for cleaning.

The switch for the vacuum was removed and the wires fastened to the sander switch, so the vacuum turns on with the sander.

I have estimated that the vacuum collects at least 95 per cent of the dust, which



Disk sander dust catcher

in our shop amounts to a little over two cupfuls a day. The vacuum bag is emptied daily during the cleanup period of the last shop class.

It is well worth the small investment and it requires very little time to adapt a vacuum of this type to your disk sander. For those instructors who would like to use a disk sander, but don't like the dust, this is one economical and efficient answer.

A PLANNING DESK

GEORGE CARDINALE
Industrial Arts Instructor
Roosevelt Junior High School
Erie, Pa.

The planning desk shown here was designed so that it could be successfully constructed by junior high school pupils. It is made of materials found in the woodworking shop and can be built entirely with hand tools.

The desk provides a place where pupils may plan their work together. There is ample storage space for drawing instruments, drawing materials, books, plans, and magazines dealing with industrial arts. A *T* square may be used on the slanting top since the edges have been prepared for it.

The pupils in our woodworking shop helped to design the desk and offered numerous suggestions as to how best it could be built to meet their needs. They constructed it with very little supervision and obtained satisfactory results.

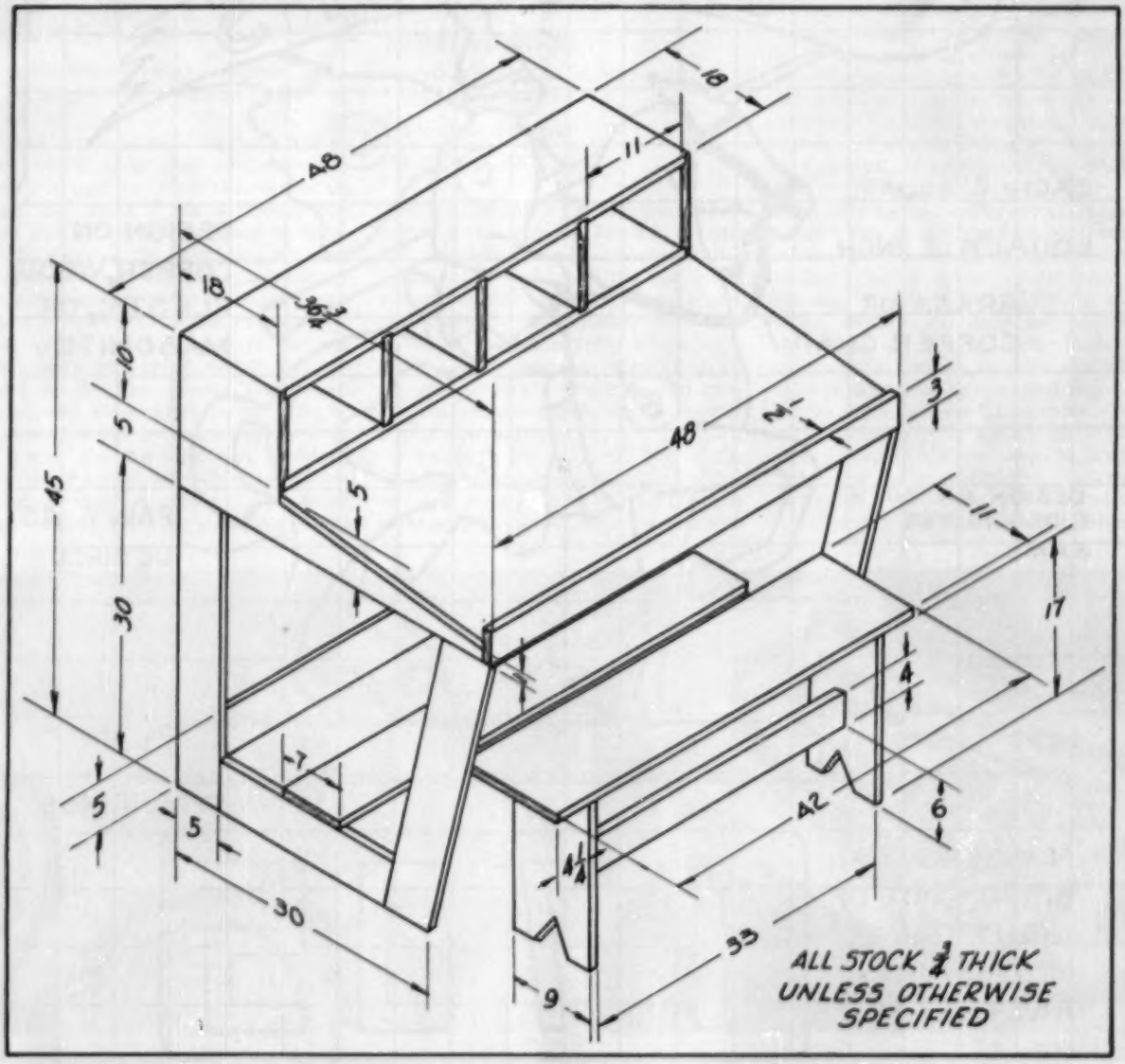
The interest of the pupils in this project, the results in its construction, and the manner in which it has been put to use demonstrates its place in the industrial-arts shop.

SILHOUETTE NAME AND ADDRESS SIGN

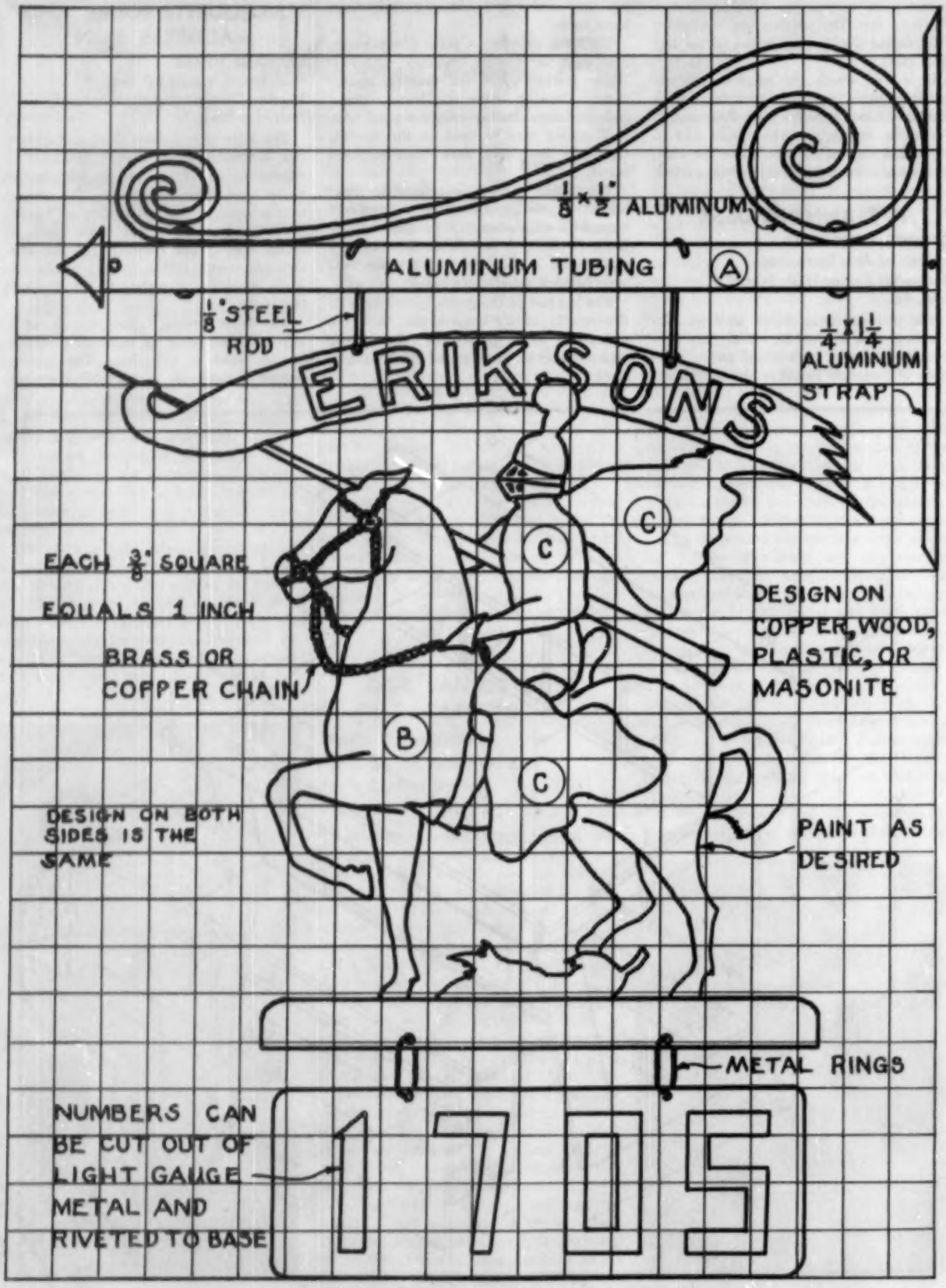
DONALD HILLER
Teacher of Industrial Arts
Leyden Community High School
Franklin Park, Ill.

The attractive, durable name and address sign described herein is easy to make, inexpensive, and large and legible enough to be read from a distance. The project requires only a few common tools readily available in most school wood craft, or metal shops. The project can be constructed from metal, wood, plastic, or ¼-in. masonite, according to the desire of the student.

The horse design *B*, can be cut out of any available piece of material that may be on hand in the shop. The scrolled hanger is made of ⅛ in. thick aluminum



Details of the planning desk by George Cardinale



Details of the silhouette name and address sign by Donald Hiller

Silhouette name and address sign fastened to a wooden pole

riveted to aluminum tubing and also to the vertical ¼ in. thick aluminum strap which is used to attach the sign to the post. The tubing *A* can be formed in a vise until it becomes elliptical in shape.

The figure of the knight and his cloak *C*, the letters of the name, and the address numbers can be cut out of light gauge metal or other material and riveted to the base pieces, or these parts of the sign can merely be painted directly on both sides of the base pieces. The hanger, horse, and house numbers can then be fastened together with steel rings or links of chain. The assembled sign should be polished or sanded, after which a few coats of lacquer should be applied as a protective finish. Finally, the completed sign should be fastened to a wood or metal post.

The sign that the writer made was constructed from copper, brass, and aluminum. The numbers, letters, and parts of the knight design were cut out of brass and aluminum and then riveted to the copper base sections. Whatever type of material is used, the construction steps are the same. Here are the tools and materials that you will be needing in constructing the sign.

Tools: jig saw or jewelers' saw, saw blades, mill file or wood rasp, small round or half round file, ball-peen or riveting hammer, hand drill or drill press, straight shank twist drills, flat varnish brush.

Materials:

1 piece wood, masonite, metal, or plastic 15 by 15 in., thickness as desired
1 piece wood, masonite, metal, or plastic 4 by 12 in., thickness as desired
1 piece aluminum tubing ¾ in. in diameter, 18 in. long
1 piece aluminum strap ⅛ by ½ by 34 in.
1 piece aluminum strap ¼ by 1¼ by 12 in.
1 piece steel rod ⅛ in. diameter, 16 in. long
Small aluminum and brass rivets
Steel wool
Brushing lacquer

THE "PROFESSIONAL LOOK" — A PLASTIC BOWL

ROBERT SWANSON
Assistant Professor of Industrial Education
Stout State College
Menomonie, Wis.

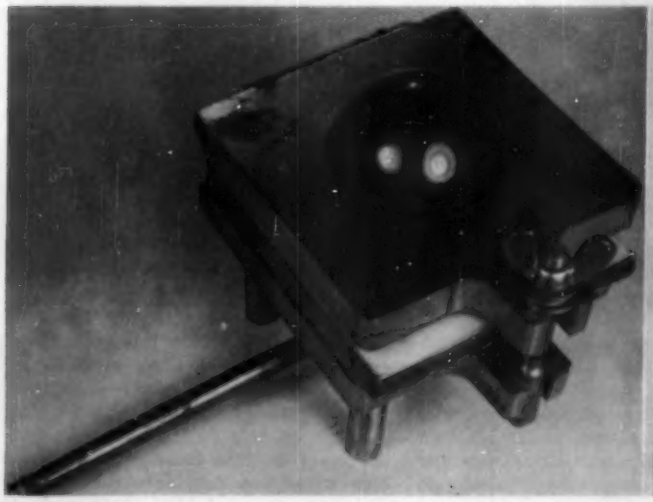
How important is the appearance of an industrial-arts project? Should it compare favorably with commercial products?

Projects in industrial arts are means rather than ends. We would have a good deal of difficulty in establishing the validity of our field solely in terms of the value of the projects produced — and we should not attempt such a validation. Nevertheless, few teachers assume that the finished project is unimportant.

Whether we like it or not part of the evaluation of industrial arts by the students and their parents will be done on the basis of the projects brought home. Projects with the *professional look* can have valuable public relations effects.

Aside from this type of consideration, the achievement of many of our objectives is enhanced by using projects that closely resemble commercial work. The national industrial-arts objective, proposed by the American Vocational Association, "appreciation and use," is defined: "to develop in each pupil the appreciation of good design and workmanship and the ability to select, care for, and use industrial products wisely." One of the important advantages of our field in developing this kind of student behavior is that we can provide concrete experiences with the tools, materials, and processes which are combined to produce industrial products. Probably any carefully directed shopwork can have value in developing consumer intelligence, but the closer the resemblance of the work to that of industry, the less will be the gap over which the transfer must be made.

Our first national objective, "interest in industry," states that our work seeks "to develop in each pupil an active interest



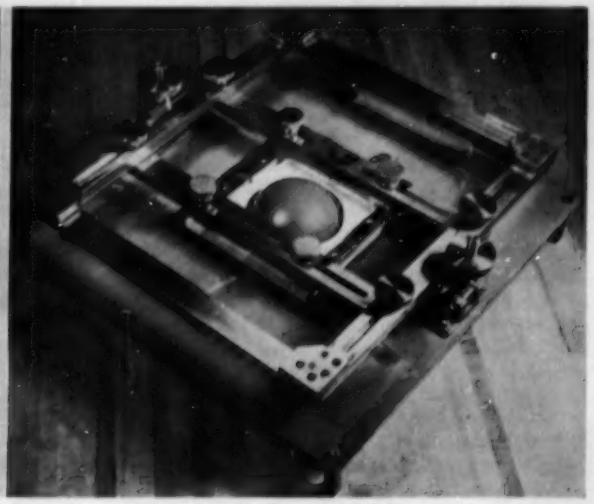


Fig. 3. A shop-made piece of equipment for free blowing. At right, Fig. 4. A versatile piece of shop-made equipment for free blowing objects of different sizes and shapes

— Photos by Stout State College, Audio-Visual Education Department

Fig. 1. An aircraft dome in production
— Photo by Rohm and Haas

Fig. 5. A school type plastics press
— Photo by O'Neil-Irwin Mfg. Co., Lake City, Minn.

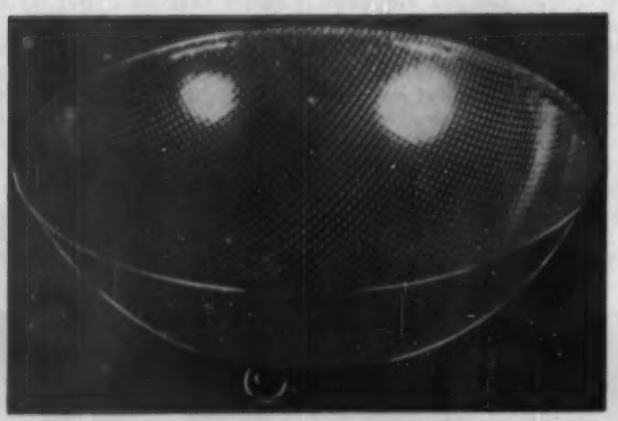


Fig. 2. A bowl of acrylic plastic
— Photo by Stout State College Audio-Visual Education Department

in industrial life and in the methods and problems of production and exchange." Projects that no commercial distributor would purchase at any price would seem to have questionable value as means of accomplishing this objective. Methods which have been abandoned by trades and industry or never adopted by them at any stage in their development can do little to "interpret industry" to our students. This points out another place where projects with the professional touch have value.

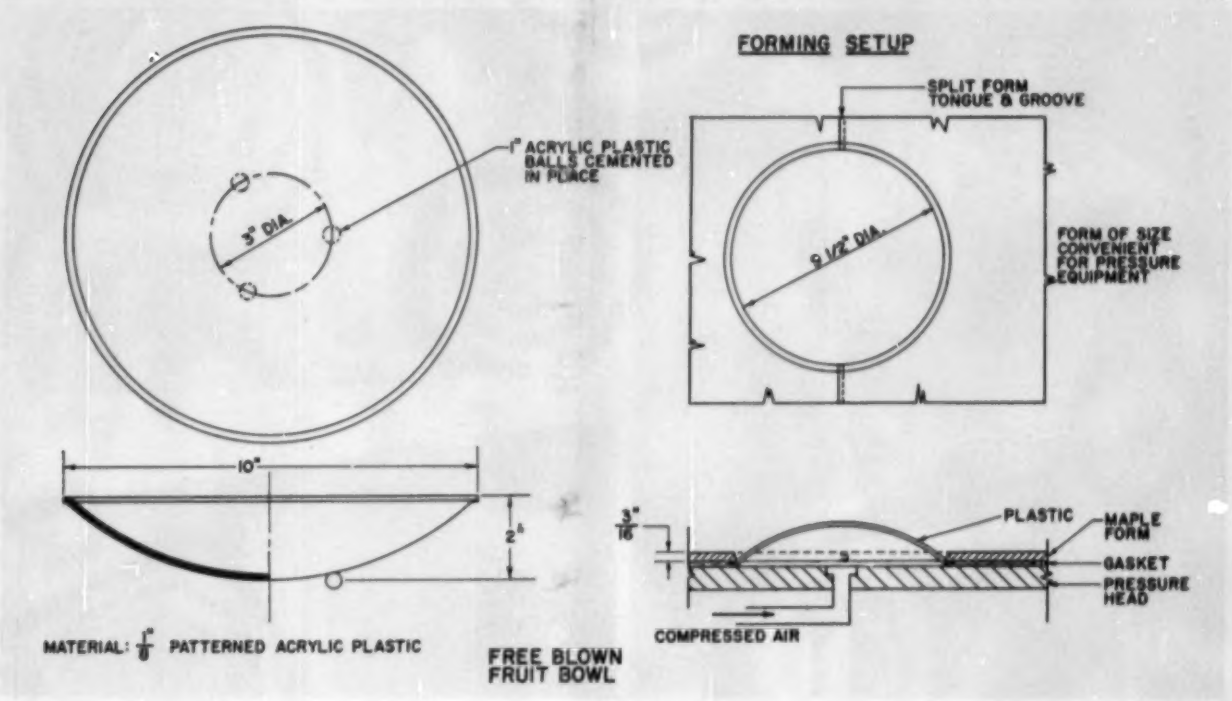
What are the problems that we face in making our projects more attractive and similar to those of industry? There are several obvious difficulties. Our equipment is not the specialized extensive equipment of industry. Our students are younger, less skilled workmen than those of industry. Financial limitations are present.

Probably the key to alleviating difficulties of this type is adaptability. Often specialized equipment of industry is merely an adaptation of a basic item of equipment found in the school shop. Frequently a simple piece of equipment can be made by the teacher or the students. Jigs and fixtures are used extensively in industry to achieve specialization and can be used similarly in the school.

The teacher's problem in turning out professional work with unskilled students is often not too different from mass production industry's problem. Many of the workers contributing to the production of fine-looking commercial products are unskilled or semiskilled. The equipment and methods have been so set up as to enable the production of precision work with limited skill. Certainly some phases of industrial-arts work could be done on this basis. At the early stages the teacher may serve as the engineer and foreman, and the students as operatives. Later on the students can assume some of these top-level functions.

Financial difficulties have been overcome by many teachers by choosing small articles which illustrate the same principles as large industrial products. Equipment of smaller capacity but operating on the same principles cuts the cost to the school.

Let us illustrate with a specific problem in the field of plastics. Every boy is familiar with bomber "blisters" or jet canopies. They have smooth contours and high clarity. They are often made from one of the common plastics found in schools, acrylics. Figure 1 shows such an article in production. The workmen actually producing the blister need not possess any particular skill; they place a piece of material in a frame, clamp it down, and apply heat and pressure. What junior high school boy could not do the same thing from the standpoint of skill required? The article being formed in Figure 1 is very expensive, of course, and the equipment is large and costly. But look at the



bowl in Figure 2. The operations are basically those involved in the production of the industrial product. The cost is less, depending upon the size of the bowl. A variety of equipment suitable for school use can be made or purchased. Figure 3 shows a small piece of shop equipment made especially to blow only one bubble size. Figure 4 shows a more versatile piece of shop-made equipment which can be used for objects of different sizes and shapes by making different inserts. Figure 5 shows the operation being performed on a plastics press just recently placed on the market for school use.

The important aspect of this type of project is that an article has been made that looks like something that could be purchased in a store; the operations are those of industry, the level of skill required is within the range of our students; the cost is within the limits of school funds. We have achieved the somewhat glamorous results so attractive to building student and parent interest and at the same time have facilitated the achievement of some of our important objectives.

Construction Procedure for a Free Blown Plastics Bowl

1. Make the forms. See the drawings for size and construction.
2. Cut the plastic. The stock should be approximately three-fourths inch larger all around than the diameter of the desired bowl.
3. Remove masking paper from plastic.
4. Set up forming equipment.
5. Heat plastic to proper temperature.
6. Insert heated plastic in forms.
7. Apply air pressure slowly until bowl forms to desired depth. Usually two or three p.s.i. will be sufficient for a bowl this size.
8. Maintain pressure until plastic cools.
9. Remove from forms.
10. Trim to shape on a band saw or with a coping saw.
11. Sand edges.
12. Polish edges.
13. Cement plastic balls in place for feet.

LAMINATED FISHING NET FRAME

KENNETH F. LIGHT
Negaunee High School
Negaunee, Mich.

Of great interest to the sports minded student is the laminated fishing net frame described in this article. This project brings out a method of wood fabrication that has several unique and worth-while characteristics. The principle of lamination has been used for decades in the construction of wood products with its uses ranging from the very simple plywood sheet to the more complex joists in building construction.

From the project the student learns how relatively simple it is to produce a complex curve with the thin veneers, and yet, how firm and strong the final product is.

While the fishing net frame may not be of interest to some, the same method of construction could be used for tennis rackets and other sports equipment.

Procedure

Two or three frames are made at a time on the form so that one student may help the other in places where more than one person is needed.

The teacher should take great care in cutting the form block to insure proper shape and to see that both sides are symmetrical. The block of hardwood from which the form block is cut should be large enough to leave stock from which the clamping blocks are made. Merely increase the outline shape left on the waste block by ¼ in., and pencil gauge the outline, then saw to this new line. The reason for increasing the shape ¼ in. for the clamping blocks is to insure a snug fit against the layers of veneer after they are placed on the form block. The form blocks should be about 1 in. thick.

A slight draft of 1/16 in. across the side of the form block helps when removing the blank from the form. The sides of the form and the clamping blocks should be liberally waxed with a paste wax to prevent the glue from sticking to them.

When the core for the handle is cut save the two pieces of scrap from the sides and use them as clamping blocks for the handle. Place a piece of paper under the handle portion to prevent the glue from sticking to the baseboard.

A waterproof or water-resistant glue should be used that does not set rapidly as it takes a little time to completely clamp the veneer strips. Care should be taken when gluing to see that all the surfaces of the veneer are covered. The outside surface of the first veneer strip is

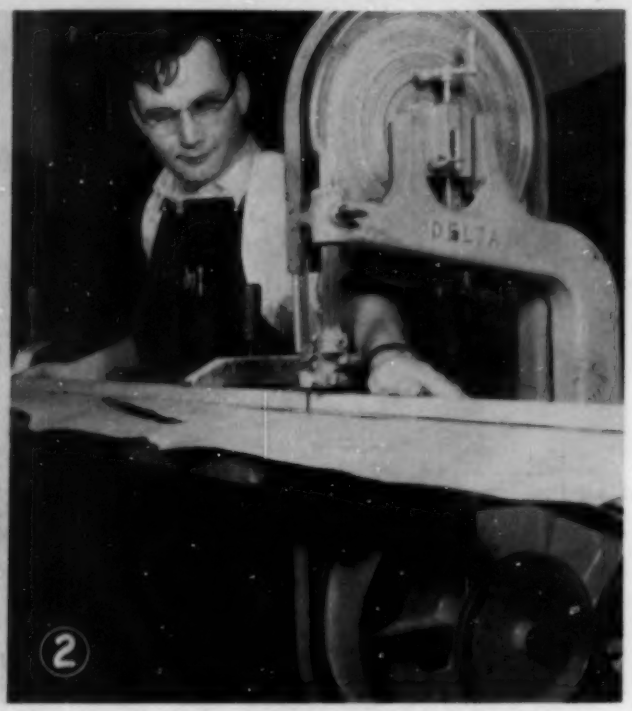


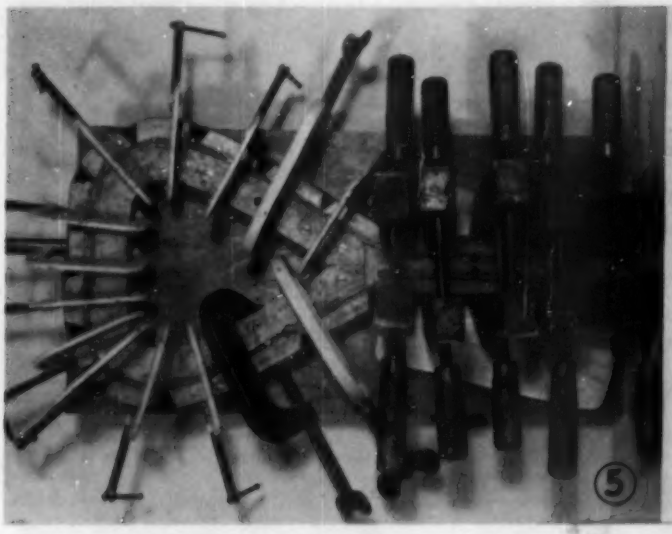
Fig. 1. Cutting handle core. Saw carefully and file or drum sand any irregularities. Save the two sides for clamping blocks. Fig. 2. Cutting veneer strips to size. Veneer strips are cut between two 2¾ by 72-in. form boards

left unglued as is the inner or last strip which is in contact with the form. However, glue is applied on the inner strip where it comes in contact with the handle core and the handle core is given an application of glue. It helps to prevent the glue from drying too rapidly if the strips are dampened slightly with a moist rag.

When dry, pry the blank up carefully working all around the form. Once started it will come off easily. After the blank is removed mark the ¼-in. thickness lines for the individual frames and saw them off with a sharp backsaw. The faces of the frame can then be planed or disk sanded flat and smooth.

The groove around the frame for recessing the stringing cord can be cut in with a chisel or on a shaper. The groove is not necessary but protects the stringing cord.

Fig. 3. Glue is applied to all inside surfaces of the veneer strips. Lay one strip upon the other after they are glued. Fig. 4. Start clamping at the center and work toward the handle; apply glue to the handle core, slip in place, and clamp handle form blocks on outside. Remember to apply wax to handle from blocks



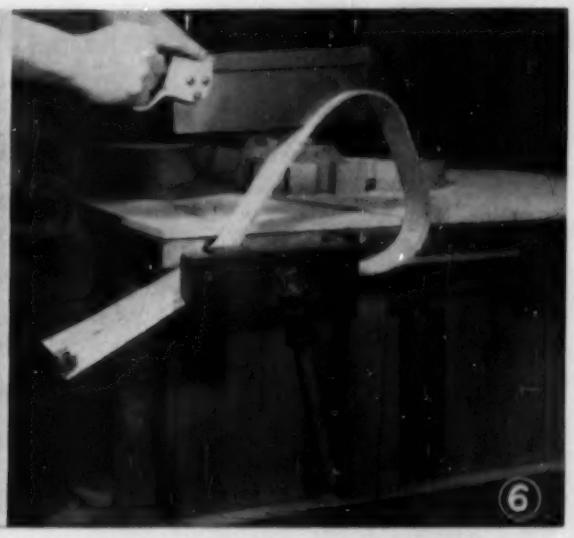
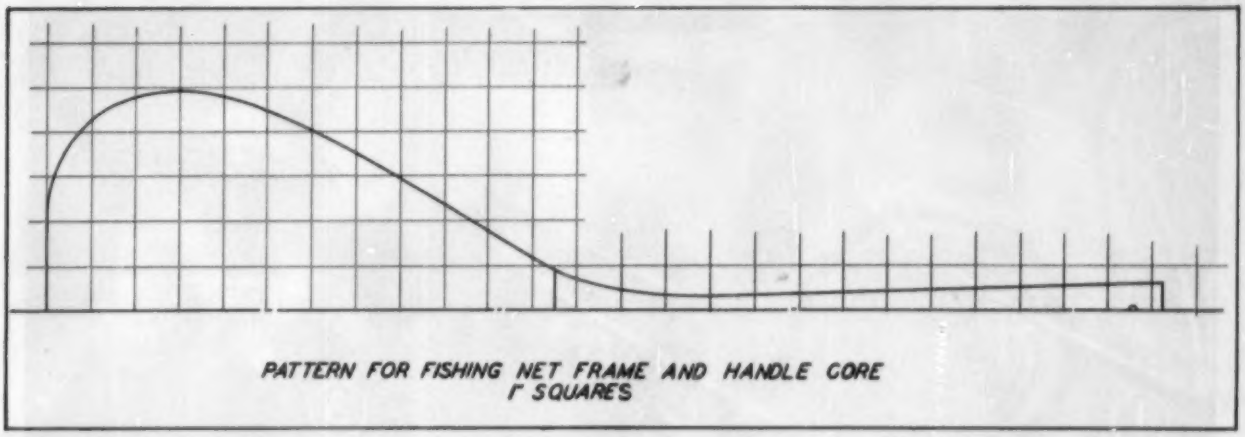


Fig. 5. Blank completely glued up. Clamping blocks are attached to webbing to facilitate handling. Fig. 6. Make the individual frames ¾ in. thick. Saw on band saw or with a back saw. Then plane and sand smooth



The holes for the net are ⅛ in. and are located evenly around the periphery of the frame with two holes being drilled through the handle core from the outside and coming out on the inside of the handle. The stringing cord is pushed through these holes when the net is laced in and the last loop or two of the net is gathered in, and the stringing cord knotted.

Before stringing in the net a coat of spar varnish should be applied to the frame.

Fig. 7. Drill stringing holes around periphery of net to suit particular net to be attached. Fig. 8. Final product. Note how net loops are pushed through from the inside. The stringing cord is slipped through the loop on the outside and then back to the inside of the frame at the handle core where it is knotted.

MAKING AN OLD BOAT NEW WITH FIBERGLAS

ALEXANDER F. BICK

Teacher in Milwaukee Schools

The Milwaukee Downer College

The Stout State College, Summer Session

This is the story of an unwanted, homeless derelict — a 12-foot boat that had seen better days 30 some years ago. It had obviously been designed and built with loving care and honest craftsmanship, not only for utility but also with an idea to beauty as its flowing curves amply testified.

Here it was, beached in the back yard of an equally run-down estate that likewise had fallen prey to the changing fortunes of its former owners. When a friend of ours, a Mr. Edwards, found it more or less by accident, it was ready to fall apart. Two planks were missing, several ribs were broken, the seats were gone and the transom would have to be replaced. The keel was split and the gunwale strips were gone.

When lifting the boat off the ground it held together. Except for the damage already related, the hull was in reasonably good shape. Good enough, in any event, to be worth ten dollars and the work of transporting it home. Edwards' primary interest was the design of this once beautiful craft. The deal was made; neighbors across the fence got a few laughs out of it and our new owner good naturedly took a few jokes in his stride. Edwards, an industrial engineer, knew what he wanted and he knew how to get it.

Let me just say that I had no hand in this particular undertaking. I am relating it as it was told to me. As you may have already surmised, Mr. Edwards repaired the hull and covered it with Fiberglas. That part of his work is being described and illustrated in this article. However, there is more to it.

Three new all Fiberglas boats were formed over the restored hull which served as the mold, a lightweight sailboat, a fishing boat, and an 8-foot dinghy. And even this is not the end. From the original boat, Fiberglas internal molds were made in which that same slick design was duplicated. For all practical purposes, a boat a day could have been made from one of these molds had anyone been interested in producing them on a production basis.

It need scarcely be pointed out that treating hulls with Fiberglas is not confined to old boats. Several manufacturers are now applying Fiberglas to wood hulls to leakproof them, to strengthen them, or to eliminate the need for annual calking and painting. This added feature adds relatively little to the cost because of savings made in labor economies in the basic hull construction.

In previous articles of this series, the value of combining old materials with new ones to make products faster, more economical and better, has been repeatedly emphasized. Whether your class is interested in building a new boat or restoring an old one, Mr. Edwards' experience should be of practical interest to every student.

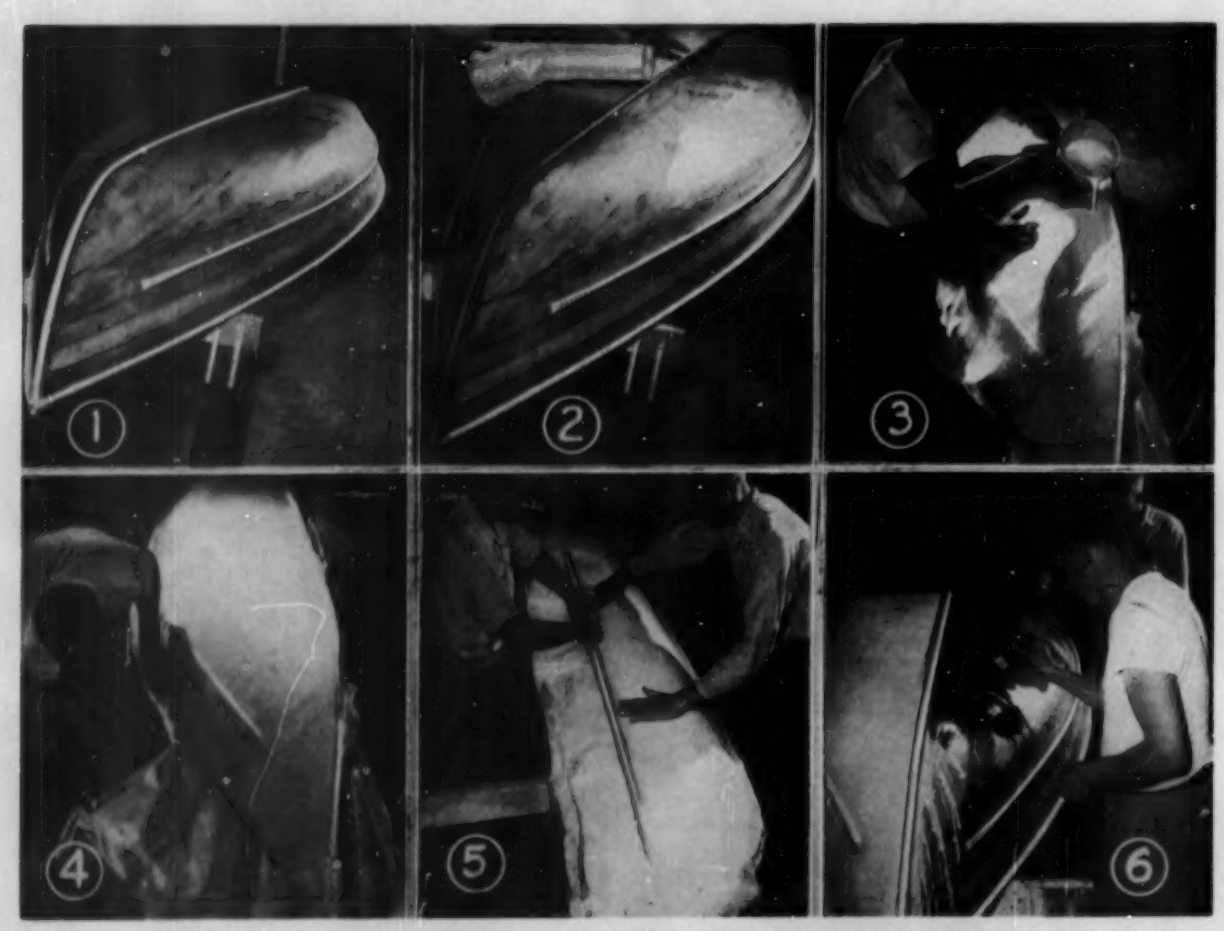


Fig. 1. The cleaned and sanded hull is ready for fiberglas laminating; Fig. 2. Apply a brush coat of Castoglas resin on the clean hull, and then put on the fiberglas fabric; Fig. 3. Flow on more resin and carefully brush or work it in with your hands; Fig. 4. Trim the cloth after the resin has set and the fabric is firmly adhering to the hull; Fig. 5. Shape the cloth around the keel and splash rail, and remove all wrinkles; Fig. 6. Finish one side and then repeat the process on the other half of the hull

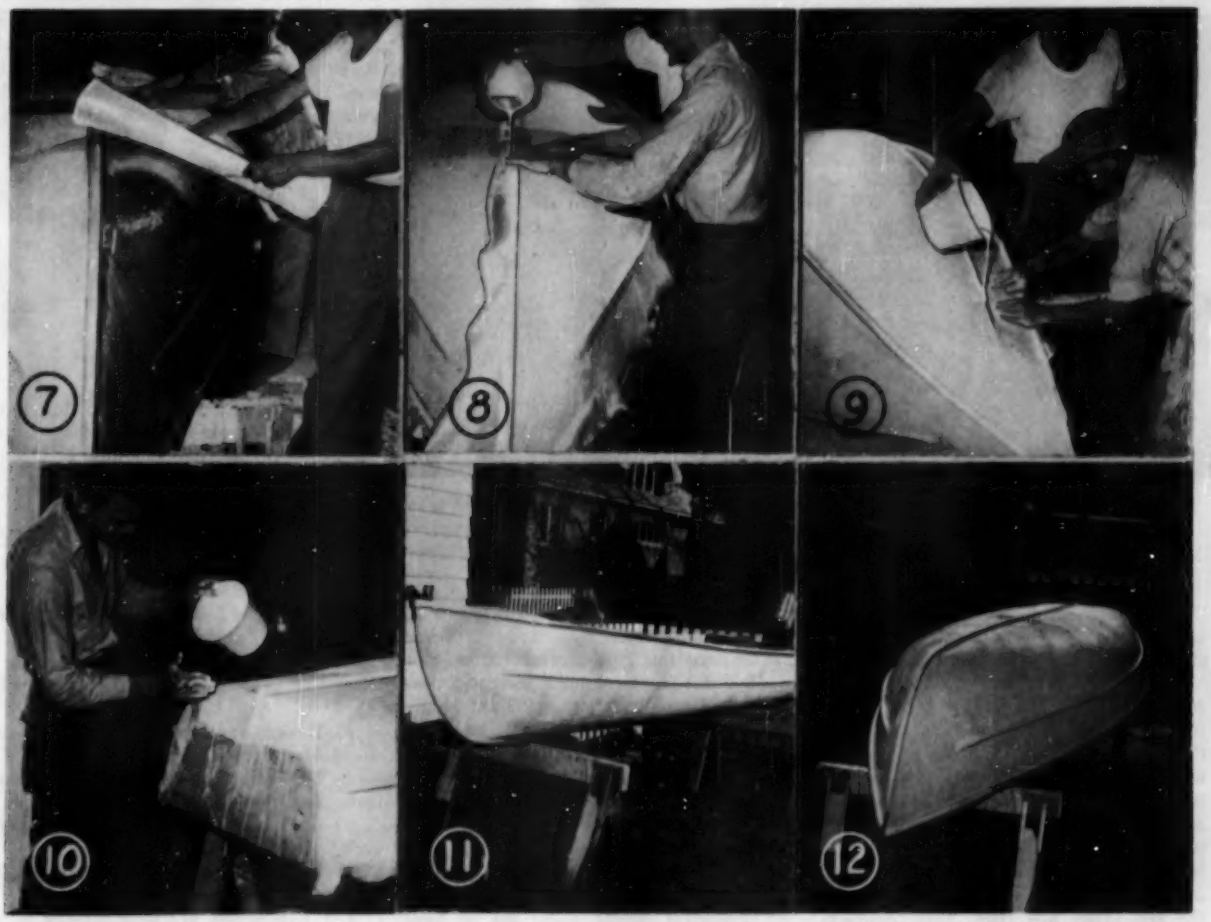


Fig. 7. Roll cloth on tube or stick and lay upon wet resin coated surface; Fig. 8. Pour Castoglas resin on glass cloth and spread out smooth with hands; Fig. 9. Tip boat sideways to facilitate work of shaping cloth tightly around rail strips; Fig. 10. Be sure that cloth does not bulge at the chines. Make a "V" cut if necessary; Fig. 11. Smooth as glass to match the sleek lines of a beautifully designed craft; Fig. 12. Total cost of restoration: $57.35, including the cost of the old hull

Futhermore, this same basic principle also applies to improving wood or metal tanks, to leak- and acid-proofing them or adding years to their usefulness at very little cost.

The first step in the restoration of the boat was the repairing of the hull. Two new 2½-in. planks were needed and a new ¾-in. plywood transom. Instead of carefully matching and fitting the planks, which would have required considerable skill and time, two boards were loosely fitted into place, screwed to the ribs, filled in with a mixture of Castoglas resin and ground glass fiber. This resin putty set hard within an hour.

Several smaller plank sections were cut out and repaired in a similar manner. Splintered ribs were filled in with resin. Gouged out areas and several small breaks were cleaned and puttied the same way. Then the entire hull was sanded down to the clean wood. Keel, splash rail, and gunwale strips were replaced with electric conduit pipes around which resin-impregnated glass tape had been tightly wound. These were fastened to the wood hull with screws and then sealed with Castoglas. With this preliminary preparation accomplished, the boat was ready for the laminating operation.

When the rough and dusty work was completed, the garage in which the boat was repaired was thoroughly cleaned up. Everything not needed was taken out to provide ample and uncluttered work space. Newspapers were spread on the floor under the boat to catch any resin drippings. A workbench was also covered with paper and all the tools and materials needed for the work assembled on this one bench in quick and ready reach.

Two brushes, mixing sticks, paper cups, a tablespoon for measuring hardener, scissors for cutting the glass cloth, and a few rags for wiping hands and any spilled resin were all the tools needed. On the material list were two gallons of Castoglas resin with hardener, 8 oz. white color paste, 9 yards of 38-in. wide Fiberglas fabric, and a quart of cleaner.

For the sake of presenting the laminating operation in a clear-cut manner it might be well, from this point, to describe the work step by step as it is to be done.

Step 1. Preparing the Hull. This is, of course, the first step but having already described it in detail, all that needs to be said here is a word of caution. Work in the shade; never in sunlight. Place the hull on sawhorses.

Step 2. Measure the Fiberglas Cloth. Cut the cloth the length of the boat plus about 8 in. for overlap at the transom. Do not tailor it to the exact area to be covered. Roll the cut cloth on a stick or paper tube for easier handling when applying it to the resin coated hull.

Step 3. Mix hardener and castoglas resin and apply to clean hull. Mix 2 tablespoons of hardener with 2 lb. (1 quart) of Castoglas and brush it uniformly on one side of the clean hull from keel to gunwale.

Step 4. Lay the Fiberglas cloth upon the resin coated hull. Applying the cloth is the most important part of the entire hull-covering project. It is a job for two people. Carefully unroll the fabric and work it into the wet resin and remove all wrinkles

Fig. 13. Before the old wooden hull was restored, it served as a mold over which an all-fiberglas hull was formed; Fig. 14. The manual "How to Build Fiberglas Boats" describes and illustrates how this boat was duplicated in fiberglas

with your hands. It is imperative that every fiber adheres firmly to the hull.

Step 5. Apply the second coat of Castoglas when the first coat has set. Within 30 to 40 minutes (at room temperature) the resin will have hardened to a point where the surface may still be slightly tacky. A second batch of resin is now mixed to which two ounces of white color paste is added. The color thus becomes an integral part of the laminate. This second coat is brushed, or poured and spread over the still tacky first coat. This completes one side of the hull.

The same procedure is then followed in covering the other half of the boat.

Step 6. Finishing Coat. For an extra smooth surface, apply a third coat of liquid resin to which the white color paste has also been added. Within less than two hours the entire laminate will have hardened to a tackfree surface. The rough edges around the gunwale are now trimmed with a file, and then the whole is sanded down smoothly. The work is completed and the boat is then ready for many more years of service.

The truth is, the boat is better now than when it was first built. The tough, resilient skin of Castoglas impregnated Fiberglas not only leakproofs and strengthens the hull but also eliminates the need for that annual calking, painting, and refinishing chore. The boat may be left outdoors, keel up, in any kind of weather, the year round. At the beginning of the boating season it is ready to be launched the minute you are ready to go.

What Did It Cost? Here are the figures: $10 for the old hull, $8.85 for lumber, brushes, miscellaneous items, and varnish for the inside of the boat, $38.50 for the Fiberglas fabric. Castoglas resin, hardener, color paste and cleaner. Total material cost: $57.35.

What About Time and Labor? Never having done this type of work before, Edwards spent two week ends on the job, including time in getting the boat home, cleaning and repairing the hull; 35 hours in round figures. Of this, about 8 hours were spent on the Fiberglas work. This was good time for a beginner but it can be done considerably faster once experience has been gained.

In appraising the value of this boat, it should be remembered that this craft, with its compound curves, could not be built inexpensively and quickly of plywood. Its cost, at today's prices, would be around $450, plus freight charges. Obviously, this man had a bargain and so did his neighbors who used the boat for a mold.

How Were the All-Fiberglas Boats Made? Essentially the procedure was very simple. The hull was coated with a film-forming mold release agent before the resin and Fiberglas were applied, thus separating the wood from the laminate. When the resin coated Fiberglas had hardened, it was pried loose by inserting a flat tool, similar to a tire tool, between the mold and the gunwale strip and worked along, prying outward around edge of gunwale to partially loosen the hull from the mold.[1]

What Is the Future of These New Structural Materials? My own observation leads me to believe that, in spite of their tremendous growth within the past ten years, Fiberglas and liquid resins have yet to realise their full potentialities in the structural field. These new materials are here to stay and our schools should know about them now because industry is using them at an ever increasing rate to produce better products at lower cost.

[1]See Figures 13 and 14 in the 32-page manual, "How to Build Fiberglas Boats," published by the Castolite Co., Woodstock, Ill. Cost of this book is 25 cents

Many Christmas tree ornaments are held onto the boughs by means of steel florist wire. About 8000 tons of such wire is produced for all purposes each year, according to a prominent manufacturer's estimate. — *Steel Facts.*

TOOL IDENTIFICATION BOARD

PAUL G. MATTIJETZ
Metal-Shop Instructor
Whittier Union High School
Whittier, Calif.

The tool identification board described herewith was made to help students learn the names of the common wood or metal-working tools used in the school shop.

Procedure

To Make the Back Board

a) Cut ¼-in. plywood to size 24 by 44 in. with a circular saw.

b) Remove all sharp edges with a file or with No. 1 abrasive paper.

To Make Pegboard

a) Cut pegboard with band saw to 18 by 30 in.

b) Design a pattern for the pegboard toolholder or use the design shown.

c) Transfer design to pegboard using soft pencil.

d) Cut along pencil line using band saw.

e) File off all rough edges with half-round file or use No. 1 sandpaper.

Cut 1-in. dowel to 1¼-in. lengths using band saw or handsaw, six required. Drill dowels using ⅛-in. drill to receive No. 6 f.h. screw.

To Make Frame

a) Cut 1 by 2 by 26 in. on circular saw — two required.

b) Cut 1 by 2 by 46 in. on circular saw — two required.

c) Set circular saw at 15 deg. and saw off one face on all frame pieces.

d) Joint all faces and edges to remove all irregularities or rough edges. Make a fine cut.

e) Cut dado on circular saw. Make cut according to specification on drawing.

To Make Name Holder

a) Cut ¾-in. quarter-round mold to two pieces 18 in. long.

b) Cut kerf using circular saw according to drawing.

To Make Name for Visual Aid

a) Large printed letters on smooth white paper will be sufficient if name can be covered with transparent material.

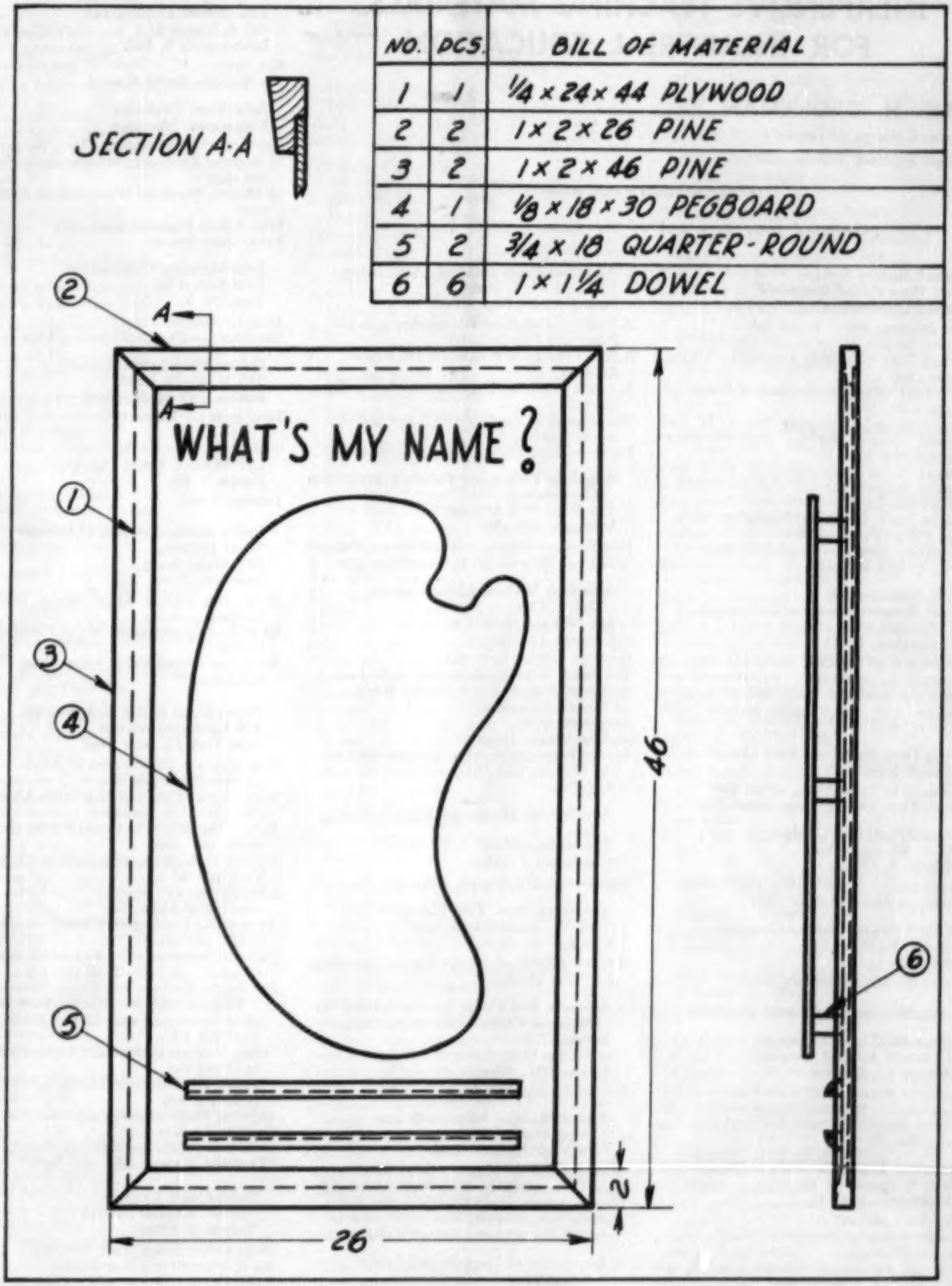
b) Use colored cardboard and Speedball pen with No. 2 pen point to make name of tools desired.

Assembly According to Working Drawing

To Make Letters for Name Plate

a) Transfer letters to Masonite and use jig saw to cut out letters.

b) Glue into place.


SECTION A-A
NO. | PCS. | BILL OF MATERIAL
1 | 1 | 1/4 x 24 x 44 PLYWOOD
2 | 2 | 1 x 2 x 26 PINE
3 | 2 | 1 x 2 x 46 PINE
4 | 1 | 1/8 x 18 x 30 PEGBOARD
5 | 2 | 3/4 x 18 QUARTER-ROUND
6 | 6 | 1 x 1 1/4 DOWEL
WHAT'S MY NAME?
A
A
1
2
3
4
5
6
46
2
26

Details of the tool identification board

INEXPENSIVE TEACHING MATERIALS FOR INDUSTRIAL EDUCATION

CHRIS. H. GRONEMAN
A. & M. College of Texas
College Station, Texas

TRANSPORTATION — FILM MATERIALS

(Continued from page 26A of the January, 1956, issue)

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3044 West Grand Boulevard
Detroit 2, Michigan

Better Ignition, 35mm. sound slide
Electrical Service, 35mm. sound slide film
Standard-Duty Generator Regulators, 35mm. sound slide
Heavy-Duty Generator Regulators, 35mm. sound slide
Better Ignition, a 16-page 8½ x 11 inch booklet designed for use with the Better Ignition film kit.
Electrical Service. 20-page 8½ x 11 inch booklet designed for use with the Electrical Service film kit.
Standard-Duty Generator Regulator, 16-page 8½ x 11 inch booklet
Heavy-Duty Generator Regulators, two 8½ x 11 inch booklets

U. S. Government
Small Business Admin. or U. S. Dept. of Commerce
Washington, D. C.

Bibliography of selected industrial films on automotive production, maintenance and operation available from industrial, commercial and Government sources, (PB-111350), $1.00

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Utica 4, New York

Add Power to Your Hands, sound film
Pliers — Their Use and Care, sound film

Warner-Patterson Company
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Story of the Storage Battery, loan

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417 North Ashland Avenue
Chicago 22, Illinois

Convenient Ready-Made Press Frames
Suggestions for Selecting Clamps for the School Shop
Catalog No. 19

American Forest Products Industries, Inc.
1816 N. Street, N. W.
Washington 6, D. C.

A Teacher's Manual
Growing Wood for America
Trees for Tomorrow
The Forest Adventures of Mark Edwards
The Story of Lumber and Allied Products
The Story of Forests
A Visit to the Forest With Woody
The Forest Adventures of Mark Edwards
Tree Farming Wood-Using Firms Spur Harvesting of Cash Crops in Forests

American Paper and Pulp Association
122 East 42nd. Street
New York 17, New York

A Study of Community Dependency on the Paper and Pulp Industry
A Half Century of Progress in the Paper Industry
A Guide to Career Opportunities in the Paper Industry
The Growth of the Pulp and Paper Industry in the South
Paper — Third Fastest Growing Industry

American Turpentine Farmer's Association Cooperative
108 West Hill Avenue
Valdosta, Georgia

1501 Painting Contractors and Master Painters Tell you How to Get the Best Paint Job

American Walnut Manufacturers Assn., The
666 N. Lake Shore Dr.
Chicago 11, Illinois

Growing Walnut for Profit
The Story of American Walnut, 11th. Edition
American Walnut, The Gunstock Wood
Of Course it's walnut
Forgotten Acres
Walnut Veneer Types
Income from Cedar — Recommendations for the Growing and Management of Aromatic Red Cedar

Appalachian Hardwood Manufacturers, Inc.
414 Walnut Street
Cincinnati 2, Ohio

Appalachian Hardwoods, America's Finest

Armstrong Bros. Tool Company
5200 W. Armstrong Avenue
Chicago 30, Ill.

Booklet #THB-49, illustrating and describing our Tool Holders

Aromatic Red Cedar Association and the National Cedar Chest Association
Room 1729
666 Lake Shore Drive
Chicago 11, Illinois

Income From Cedar

Asphalt Roofing Industry Bureau
2 West 45th. Street
New York 36, New York

Good Application Makes a Good Roof Better
Plain Facts About Buckled Asphalt Shingles
How to Repair Asphalt Strip Shingle Roofs
Manufacture, Selection, and Application of Asphalt Roofing and Siding Products, 40¢

Association of Casualty and Surety Companies
Accident Prevention Department
60 John Street
New York 38, New York

I-33, Your Guide to Safety in Woodworking Shops

Associated Cooperage Industries of America, Inc. The,
Borg Warner Corporation
Educational Department
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Indianapolis 9, Ind.

Saw Sense
The Wooden Barrel Manual

Atlas Press Company
Kalamazoo, Michigan

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Safety Sam Posters

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Troy, N. Y.

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Sandpaper — How to Choose and Use It

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315 Westport Road
Kansas City 11, Missouri

How to Make Lumber

Bennett, Charles A.
237 Monroe Street
Peoria 3, Ill.

Lumber Table

Better Business Bureau of Houston
West Building
817 Main Street
Houston, Texas

Facts You Should Know About Buying or Building a Home
Facts You Should Know About Prefabricated Houses
Facts You Should Know About Home-Insulation

Better Light Better Sight Bureau
420 Lexington Avenue
New York 17, New York

New Light on Your Sewing Problems (B-556), $2.50 per 100
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Boice-Crane Friction-Matic Wet Tool Grinder
Metal Spinning for Home Craftsmen

California Redwood Association
576 Sacramento St.
San Francisco 11, Calif.

California Redwood . . . Its Properties and Uses
Whatever the Job
Redwood Region Tree Farms
In This Region, A historical background of the redwood forest and the region in which it grows
Physiology of Trees
Tree Farms in California
Tree Farm . . . Selective Cutting
Farm Structures
Use of Redwood in Manual

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Niagara Falls, New York

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Safe Speeds for Grinding Wheels

Champion Paper and Fibre Company
Public Relations Dept.,
General Office
Hamilton, Ohio

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6134 S. Oak Park Avenue
Chicago 38, Illinois

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Norwalk, Conn.

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9021 Bessemer Avenue
Cleveland 4, Ohio

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New York 54, New York

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Philadelphia 35, Pa.

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Pittsburgh Plate Glass Company
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Fig. 65, The Dixon Manual for Artisans in Wood and Metal, $1.50

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Tacoma 2, Washington
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Hardwood Plywood Commercial Standard CS35-49

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Grinding Wheel Data Book

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Southern Hardwood Interiors

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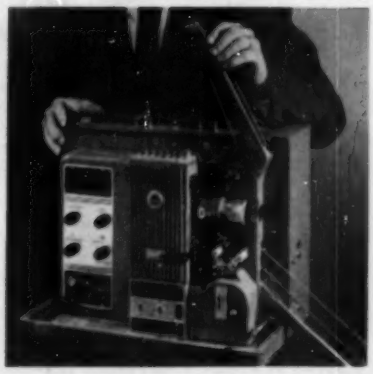
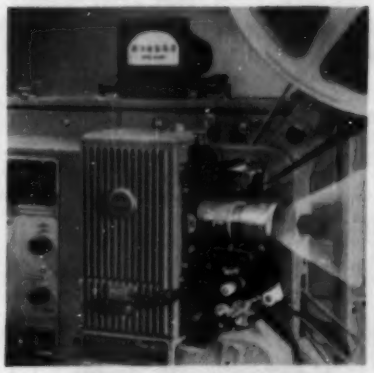
(Continued on page 16A)

How many of these Pageant benefits exceed *your* present specifications?



1. Easy setups. *Unfold* the Kodascope Pageant Projector's arms into position—there are no screws or fittings to fiddle with. Drive belts are attached, ready for use. Then thread the film, following the clear, simple diagram on the projector base, and start your run.



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3. Extra-bright pictures. The Pageant Projector's Super-40 Shutter automatically provides over 40% more screen light at sound speed than standard shutters. This lets you use big screens, long throws, even leave sufficient room light for note taking.

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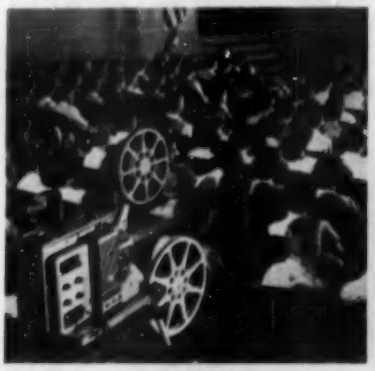

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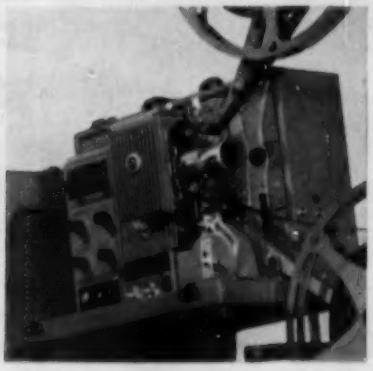

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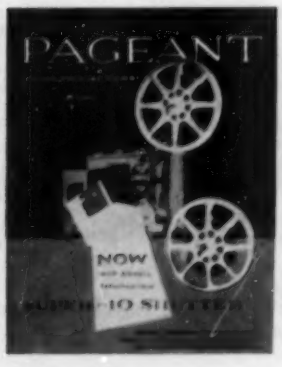

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(Continued from page 62)

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Technical Note Number D-11, How to Distinguish Black Ash from Commercial White Ash Lumber
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Technical Note Number F-2, Commercial Liquid Glues
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Technical Note Number 119, Strength of Southern Pine and Douglas-Fir Compared
Technical Note Number 125, Identification of Oak Woods
Technical Note Number 131, Properties of Ordinary Wood Compared With Plywood
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Technical Note Number 162, Distinguishing Characteristics of Mahogany And Woods Commonly Called Mahogany
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Technical Note Number 218, Weights of Various Woods Grown in the U. S.
Technical Note Number 221, Weathering and Decay
Technical Note Number 223, A Factory Method for Testing Hardness of Glue Joints
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Technical Note Number 227, Tooth-Planing Or Sanding not Necessary to Effect Strong Glued Wood Joints
Technical Note Number 228, Aluminum Paints
Technical Note Number 229, Comparative Decay Resistance of Heartwood of Different Native Species When Used Under Conditions that Favor Decay
Technical Note Number 232, Chemical Treatment of Surfaces Improves Joints with Certain Woods and Glues
Technical Note Number 233, Approximate Air-Drying and Kiln-Drying Periods for 1-Inch Lumber
Technical Note Number 234, Longitudinal Shrinkage of Wood
Technical Note Number 236, Nail-Holding Power of American Woods
Technical Note Number 239, An Instrument for Measuring Wood Equilibrium Moisture Content
Technical Note Number 240, A Hundred Definitions Pertaining to Wood and Other Forest Products
Technical Note Number 243, General Observations on the Nailing of Wood
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Technical Note Number 247, Nailing Dense Hardwoods
Technical Note Number 255, Hand-Operated Portable Glue Spreader
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Technical Note Number 257, Woodworking Glues of Natural Origin
Technical Note Number 258, Synthetic Resin Glues for Wood
Hardwoods of the South
Properties, Selection, and Suitability of Woods for Woodworking
Technical Bulletin 158, Comparative Strength Properties of Woods
Vegetable (Starch Glue), No. R30
Casein Glues: Their Manufacture, Preparation, and Application, No. D280
Blood Albumin Glues: Their Manufacture, Preparation and Application, No. R281-2
Animal Glues: Their Manufacture Testing, and Preparation, No. D492
Shrinking and Swelling of Wood in Use, No. 736
The Sap or Moisture in Wood, No. 768
Important Factors in Gluing with Animal Glue
Slant Driving of Nails! does it pay?, No. R954
Effect of Nail Points on the Withdrawal Resistance of Plain Nails, No. 1226
The Flotation Method of Determining the Specific Gravity of Wood, No. 1398
Some Methods of Gluing Light Laminated or Plywood Curved Shapes From Veneer, No. R1485
Methods of Determining the Moisture Content of Wood, No. R1649
Moisture Content of Wood in Use, No. 1655
Bleaching Wood, No. R1705
Bending Solid Wood to Form, No. 1764

List of Manufacturers and Dealers for Log and Lumber End Coatings

United States Forest Service
Washington 25, D. C.

O-32 Suggestions for Integrating Forestry in the Modern Curriculum
AIB-49, Our National Forests, 20¢
AIB-71, Water and Our Forests, 10¢
AIB-83, Highlights in the History of Forest Conservation, 15¢
AIB-91, The Work of the U. S. Forest Service, 10¢
FB-1989, Managing the Small Forest, 20¢
G-7, You and Forest Fires
L-282, Know your Watersheds, 5¢
MP-388, Living and Forest Lands, 10¢
AH-53, Forestry for 4-H Clubs, 20¢
Unnumbered, Products of American Forests, 20¢
TDS-E, Trees of Eastern United States, 16 species
TDS-S, Trees of Southern United States, 16 species
TDS-W, Trees of Western United States, 10 species
O-31, The Well-Kept Farm Woods
K-1, All Aboard the Forestry Special, a playlet
K-4, Christmas Trees, Identification, Safety, and Conservation
K-6, Edible Fruits of Forest Trees
K-8, Alaska's Forests
K-15, Making Paper From Trees
K-16, Logging and the Production of Lumber
K-19, State Trees, List of
K-25, Uncle Billy's Speech
K-26, Why Leaves Change Their Color
K-27, Wood — The Material of a Thousand Uses

(Continued on next page)

read how
"boy-proof" machines
add interest to
your metalworking area
"It's Easy to Bend", an interesting 36 page book that shows how rods, straps and tubing are formed, tells how a single Di-Acro Bender is tooled for many operations.
The Spartan Model Di-Acro Box and Pan Brake and exactly how it forms many sheet metals into various shapes is fully explained in a 4 page folder.
Cylinders and how to form them in 16 ga. steel on a Spartan Model Di-Acro Roller are covered in the Roller Bulletin.
Fast, accurate cutting of sheet metal, plastics and other materials on the Di-Acro Shear is the subject of a 12 page "Handy Guide".
Advantages of the Di-Acro Notcher in box and pan projects, etc. are told in another 'Handy Guide'.
If you are adding to, or setting up a new shop, you'll also want the latest Di-Acro Specification Sheets.
Pronounced die-ack-ro
di-acro
PRECISION METALWORKING MACHINES
Please send
It's Easy to Bend
Handy Guide to Shears
Spartan Brake Folder
Handy Guide to Notchers
Spartan Roller Bulletin
Di-Acro Spec Sheets
O'NEIL-IRWIN MFG. CO.
351 Eighth Avenue
Lake City, Minneapolis
Name
School
Address

TEACHING MATERIALS

(Continued from previous page)

O-5, Memorial Forests
O-6, Forest Insects and Diseases
O-8, Field Office of the United States Forest Service
O-9, Starting a Community Forest
O-10, How Man Starts New Forests
O-11, Forestry Schools in the United States
O-13, What the Forester Does for Wildlife
O-14, The Big Three — a playlet for children
O-15, Some References on Forests and Related Natural Resources
O-16, No Bum Steers — range management cartoon folder
O-23, What to do When Lost in the Woods
O-24, How our Forests Serve Us
O-25, Enemies of the Forest
O-26, Forests of the Future
O-27, Forests and Wildlife
O-28, Forests and Water
O-35, Conservation Pledge
O-36, Suggested Questions for a High School Conservation Quiz
O-40, Ranger Rithmetic, a sixth grade Teaching Aid
O-40, Ranger Rithmetic, a sixth grade Teaching Aid
O-42, Forestry Co-Projects for Science Clubs

United States Plywood Corp.
55 West 44th. Street
New York 36, N. Y.

Wizard with Wood for Hobbies Home Repairs Woodworking Needs
New Solid Success! SLI-D-O-O-R
NOVOPLY
Finishing Instructions For Weldtex Striated Plywood
SAMARA
SURFWOOD
Only Real Wood
Weldwood Contact Cement
Instructions for Wood Finishing With Firzite and Satinlac
Directions for Mixing and Using Weldwood Plastic Resin Glue
Weldwood Prefinished Plankweld
How to Install Plankweld
Plan with Weldwood Fir Plywood for Better Living!
Tekwood and Protekwood
Molded Weldwood Plywood Church Pews
California Pine Weldwood Plywood
Questions and Answers About Weldwood Plywood
How to Install Pre-Finished Surfwood
Weldwood Presto-Set Glue
Weldtex the Striated Weldwood Plywood that Creates Entirely New Interior and Exterior Effects
Weldwood Hardboard Products
The Weldwood Catalog
Weldwood Fir Plywood
Weldwood Doors
For Beautiful Homes With Weldwood Plywood
Construction Details and Specifications
Suggested Arrangements of Weldwood Plywood Paneling For Interior Walls
Combed Plywood Will Give Your House a Lift

Utica Drop Forge and Tool Corp.
Utica 4, New York

66 B-Screw Dr. and Chisels

Von Jonker Corporation
Box 5656 Irvington Station
Indianapolis 19, Indiana

Von Jonker Multi-Shaper

Walker-Turner
Division Kearney & Trecker Corporation
Plainfield, New Jersey

Light-Heavyweight Machine Tools

West Coast Lumbermen's Association
1410 S. W. Morrison Street
Portland 5, Oregon

Today's Better Schools are Built of Wood
Beautiful Churches of Today
Standard Specifications for the Design and Fabrication of Glued Laminated Lumber
Ten Essential Standards for Fabricated Timber Structures
Open and Covered Grandstands
Flat Top Roof Trusses
Pitched Roof Trusses
An Easy Way of Planning a Farm Home
How to Build Farm Buildings that Last Longer
The Farm Book
A Composite Timber-Concrete Bridge Deck
Be Sure When You Build
How to Build Well and Save Money
Douglas Fir Lumber — Its Properties and Uses
West Coast Hemlock Lumber — Its Properties and Uses
Western Red Cedar Lumber — Its Properties and Uses
Sitka Spruce Lumber — Its Properties and Uses
A City Guards its Water — City of Seattle Proves Forestry to Be Good and Profitable In Management of its Watershed
The Story of West Coast Lumber
Just What is Conservation?
Like a Tree
The Wonder of Wood

(Continued on page 20A)

New!

Morgan's 18A Dual Purpose Woodworking Vise

Tubular Steel Handle

Gives You Two Vises in One!

The new Morgan 18A combines the speed and convenience of the rapid action vise and the smooth positive action of the continuous screw vise, all in one! Months of research, development, and exhaustive tests have proven the superior qualities of the 18A.

All semi-steel castings are machined to close tolerances. The cold rolled screw is machined with a continuous buttress thread operating on a new floating nut which permits rapid action with smoother screw action. The front jaw is pushed up to the work and a partial turn of the handle locks the work piece securely. Adjustable stop built into front jaw. Jaw measures 4" deep, 7" wide and opens to 9". Tubular steel handle.

EVERY MORGAN VISE IS UNCONDITIONALLY GUARANTEED.

Morgan makes a vise for every school shop need. Write today for free catalog showing our complete line of woodworkers, machinists, utility and hinged pipe vises.

MORGAN VISES

MORGAN VISE CO.

120 N. Jefferson Street **Chicago 6, Illinois**

Pittsburgh COLOR DYNAMICS®

Helps Workers See Their Jobs Better!

That's why tomorrow's shopmen must know how to use this modern painting system to increase productive efficiency

● Huge machine shop of western headquarters plant of the Westinghouse Electric Corporation at Sunnyvale, California, is painted according to COLOR DYNAMICS principles to provide more efficient and cheerful surroundings.

TODAY, color is playing an increasingly large part in plant efficiency. It is contributing to the improvement of plant techniques and to better relationship between workers and their management.

That's why vocational education today often includes the study of Pittsburgh COLOR DYNAMICS. This modern system of painting is based upon the simple principles of the energy which colors possess. We know some colors stimulate and inspire, others soothe and relax, and still others irritate, fatigue and depress.

By painting the COLOR DYNAMICS way every color used on walls, floors, ceilings, machines and mobile equipment performs definite functions. By the use of focal and eye-rest colors, operating parts of machines are separated from stationary parts and the materials being worked on. The operator sees his task better. Eye fatigue is lessened, thus maintaining the worker's efficiency at a higher level for longer periods. Morale-building colors improve his mental attitude toward his job. Safety colors warn him of danger areas and reduce the hazard of time-loss accidents.

Why not equip your students to be more efficient shopmen tomorrow by teaching them the principles of COLOR DYNAMICS? In addition, give them a practical demonstration of the important benefits of this painting method by using it in the decoration of classrooms and equipment.

Get a FREE Engineered Color Study of Your Vocational Classrooms!

● Write today for a copy of the free booklet which explains what COLOR DYNAMICS is and how its principles can be applied in industry. Better still, we'll be glad to demonstrate the benefits of COLOR DYNAMICS by providing you with an engineered color study of your classrooms and equipment without cost or obligation. Call the Pittsburgh Plate Glass Company branch nearest you and arrange to have a representative see you at your convenience. Or mail coupon at right.

Send for a Copy of This FREE Book

Pittsburgh Plate Glass Company, Paint Div., Department 16-31, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your booklet "COLOR DYNAMICS."

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PITTSBURGH PLATE GLASS COMPANY

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TEACHING MATERIALS

(Continued from page 18A)

Forest Resources of the Pacific Northwest and Their Use
West Coast Tree Farms Growing Trees For You
Fundamentals of Good Lumber Manufacturing and Grading Practice, 50¢
The Hallmark of Integrity
No. 14. Standard Grading and Dressing Rules for Douglas Fir, Sitka Spruce, West Coast Hemlock and Western Red Cedar Lumber, 25¢
Standard Patterns for Douglas Fir, West Coast Hemlock, Sitka Spruce, Western Red Cedar
A Lumberman's Wife Builds a Home
A Million Homes a Year . . . Forever
Wood Siding Assures Homes of Beauty
Beautiful Homes of Wood
Accent For Beauty with Douglas Fir Gutter
5,000,000 Years of Competition
Forest Laws and Practice for the Douglas Fir Region of Oregon and Washington
Gabby and the Forest Fires, 10¢
Handbook for Lumber Offices, $1.00
The Lumber Contents of a Douglas Fir Log
Secret Treasures in the Forest
Species Pamphlets
The Tree Farm Program — An Asset to Fish and Game Management
Trees of Washington
Trees to Know in Oregon
Timber is King
What's Happening to Our Washington Forests?
The Wonder of Wood
Bibliography of Forest Industry — Educational Materials
School Bibliography
Lumber Literature

Western Pine Association
510 Yeon Building
Portland 4, Oregon

Vacation Cabins Built With Log Cabin Siding
Plan Book for the Boy Builder, 5¢
Wood Carving for Pleasure, 5¢
Wood Turning in the Home Workshop, 5¢
Handicraft Sheets
Installing and Coloring Your Walls of Western Pines and Associated Woods
Knotty Pine Paneling Patterns
Research Laboratory Note No. 34: Treating white fir millwork
Bunk Bedroom Details
The Kindschi's Remodeled Their Home
Let's Build a Wood Fence
Making Motor Courts Pleasantly Remembered
Forest Crops are Growing on Harvested Private Lands in the Western Pine Region
Tree Farms of the Western Pine Region
Reseach and You
Idaho White Pine . . . Ideal For Wood Patterns
Sugar Pine for Perfect Patterns Standard Patterns
Western Pine Paneling Patterns
Western Pine Moulding Patterns
Western Pine Association's Forest Practice Rules
Forest Crops are Growing
Tree Farms of the Western Pine Region
Sugar Pine . . . The King of Pines Idaho White Pine . . . A Genuine Pine, 50¢
Ponderosa Pine . . . The Pick O' The Pines, 50¢
White Fir of the Western Pine Region — Its Properties, Uses and Grades, 50¢
Rapid Method of Determining Moisture Content of Lumber Shrinkage and Swelling of — Ponderosa Pine, Idaho White Pine, and Sugar Pine
Douglas Fir of The Western Pine Region — Its Properties, Uses and Grades, 50¢
Larch of the Western Pine Region — Its Properties, Uses and Grades, 50¢
Facts About Sugar Pine
Facts About Idaho White Pine
Facts About Ponderosa Pine
Facts About Western Red Cedar
Facts About Incense Cedar
Facts About Larch
Facts About Douglas Fir
Facts About White Fir
Facts About Engelmann Spruce
Facts About Lodge Pole Pine
Stain is Not Decay Standard Grading Rules for Ponderosa Pine, Sugar Pine, Idaho White Pine, Lodgepole Pine, Larch, Douglas Fir, White Fir, Englemann Spruce, Incense Cedar, and Red Cedar Lumber, 25¢
Rules for Computing Industrial Cut Stock Footage
Painting over Knots with Knot Sealer WP-578
Permatol . . . A Preservative Treatment for Exterior Millwork, 5¢
How to Install and Finish Paneled Walls of Western Pine
WP-578 Seals the Knots
Treating White Fir Millwork — Research Note No. 2.2212
Friendly Home Ideas in Western Pine
Data Sheets: on Boards; Dimension; Finish and Moulding; Paneling; Siding; Windows, Doors and Frames

West Virginia Pulp and Paper Company
230 Park Avenue
New York 17, N. Y.

Growing and Harvesting Tree Crops
Tomorrow's Trees

(Continued on page 22A)

LW

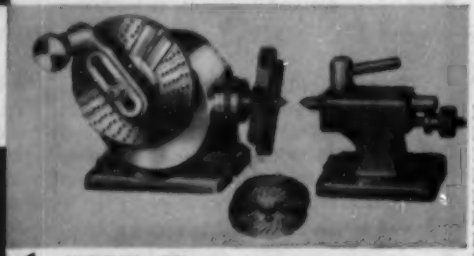
America's Largest Builders of

DIVIDING HEADS

Accurate, Heavy Duty

Ball bearing thrust on worm shaft and rear end of spindle. Headstock spindle has threaded nose. Large tapered bearing adjustable for end play. Head tilts past 90°. Worm wheel and alloy stress-proof steel worm cut to close limits for accuracy. Complete with three index plates for dividing all numbers to 50 and even numbers to 100 except 96T. Index chart shows all divisions obtainable to 380. Specify left (illustrated) or right hand model.

MODEL SD
6½" Swing. Spindle threaded 1½"-8. ⅝" table slot tongues. 36 lbs.
$145.00



MODEL BP
11" Swing for plain milling machine. Spindle threaded 2¼"-10. ⅝" table slot tongues. 140 lbs.
$250.00

MODEL AU
11" Swing. Fully universal for complete indexing and spiral cutting. Spindle threaded 2¼"-10. ⅝" table slot tongues. 190 lbs.
$367.00

* See your dealer or order direct, giving dealer's name.

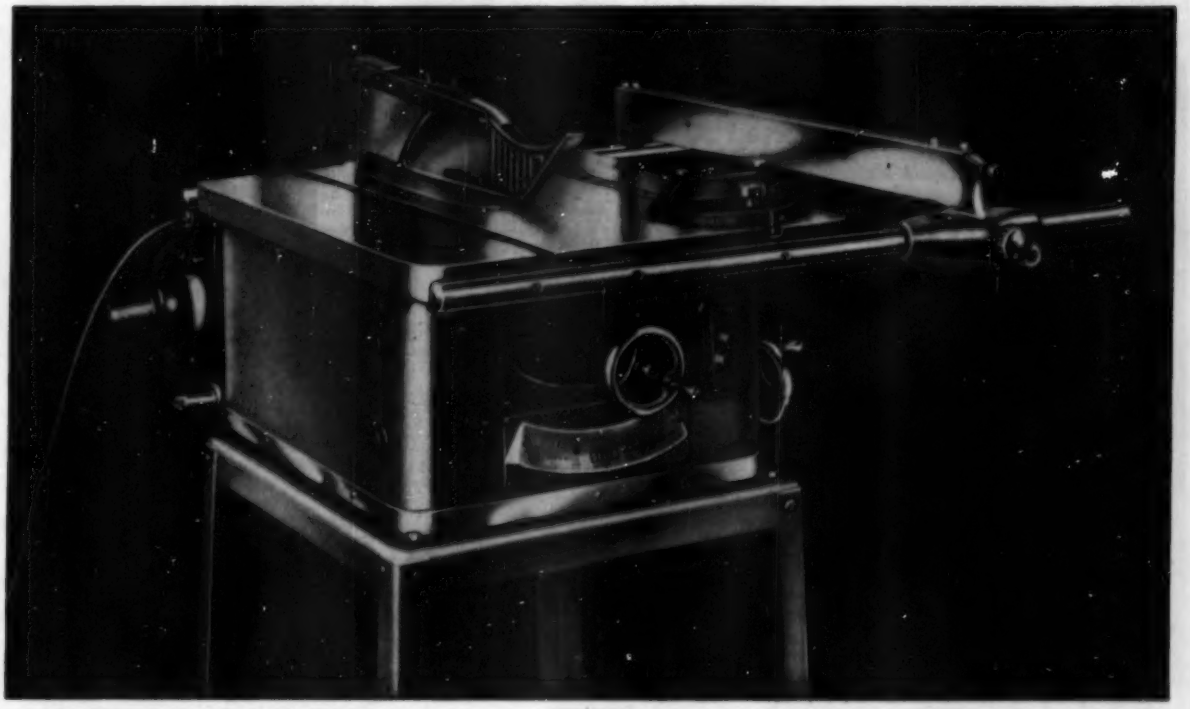
Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products

L-W CHUCK COMPANY
71 South St. Clair Street
Toledo 4, Ohio

ROCKWELL-BUILT

new DELTA

10" tilting arbor bench saw



Delta's great new 10" Tilting Arbor Bench Saw gives you big saw capacity and performance for little more than the price of an 8" saw. And it also gives you all the safety, precision and durability that have made Delta tools the choice of more than 70% of U. S. school shops.

SAFE—Completely covered drive mechanism provides maximum safety for student, prevents damage to saw. A new push button switch prevents accidental starting.

BIG—Full 10" capacity (cuts stock 3¼" thick, rips to center of a 48" panel) handles practically any job.

ECONOMICAL—It not only costs less to buy, but its rugged Delta quality assures minimum maintenance over the years.

IDEAL SECOND SAW—Because it gives you big capacity at low cost, it makes an ideal "second" saw to take care of increased enrollments.

See the new Delta 10" Bench Saw—compare it! Get all the facts, then make up your own mind! Your Delta Dealer is listed under "TOOLS" in the classified pages of your phone book. Send the coupon for catalog information—now!

Send Coupon For Free Catalog!

Delta Power Tool Division, Rockwell Manufacturing Co.
4028 N. Lexington Avenue, Pittsburgh 8, Pa.

☐ Please send name of my nearest Delta Dealer.

☐ Please send Delta Industrial Catalog on new Delta 10" Tilting Arbor Bench Saw

Name _____ Title _____

School _____

Address _____

City _____ County _____ State _____

DELTA ROCKWELL **DELTA** QUALITY POWER TOOLS

Another Product by **Rockwell**

DELTA QUALITY COSTS NO MORE

TEACHING MATERIALS

(Continued from page 20A)

Weyerhaeuser Sales Company
First National Bank Building
St. Paul, Minnesota
P. O. Box 629
Newark, New Jersey
Tacoma Building
Tacoma, Washington

Tree Farming in the Pacific Northwest
Forest Products Research

Wood Conversion Company
First National Bank Bldg.
St. Paul 1, Minnesota

Nu-Wood Tile Application
How-To-Do-It Book Applying Balsam-Wool Insulation

Zellerbach Corporation, Crown
343 Sansome Street
San Francisco 19, Calif.

Growing Paper on Tree Farms
Paper — Its Story

WOODS — CHARTS AND SAMPLES

American Forest Products Industries, Inc.
1816 N. Street, N. W.
Washington 6, D. C.

Fire Poster, full color
Products of American Forest, size 25" x 30"
Where We Grow Our Trees, size 25" x 36"

American Walnut Manufacturers Association
666 North Lake Shore Drive
Chicago 11, Illinois

American Walnut — A Source of Quality and Variety — A 30" display sheet illustrating principal figure types of cabinet woods
Let Young Walnut Trees Grow, a 22" x 18" display sheet
Let Young Cedar Trees Grow, a 22" x 18" display sheet

Armstrong Bros. Tool Company
5200 W. Armstrong Avenue
Chicago 30, Illinois

Chart #M-1, showing the correct angles for the grinding of Tool Bits

Disston & Sons, Inc., Henry
Philadelphia 35, Pa.

Set of Wall Charts on Hand Saws, Files, Hack Saw Blades, Chisels. Set of these furnished free of charge to any instructor writing in for same
How to Use a Disston Hand Saw
How a Disston Hand Saw Cuts
Disston Wood Turning Chisels
Disston Special Purpose Saws

Douglas Fir Plywood Association
301 Tacoma Building
Tacoma 2, Washington
1232 Shoreham Building
Washington 5, D. C.
848 Daily News Building
Chicago 6, Illinois
500 Fifth Avenue Building
New York 18, New York

Wall Chart of Douglas Fir Plywood Grades and Uses
Do-It-Yourself Toy Plans
Demountable Music Wall, Plan no. 8
Island Entry Wall, plan no. 6
Child's Storage Wall, plan no. 5
Storage Port, plan no. X-10
Odds and Ends Cabinet, plan no. 7
Music and TV Center, plan no. 14
Patio Furniture, plan no. X-12
Flexible Storage Wall, plan no. 1
Under-Eave Storage, plan no. 2
Shelf-Door Wardrobe, plan no. 3
Sectional Storage Wall, plan no. 4
Garden Cabinet, plan no. X-11
Outdoor Storage Wall, plan no. X-9
End or Bedside Table
Coffee Table
Base and Wall Cabinets
How to Make A Modern, Double-Duty Desk of Douglas Fir Plywood
Plans and Instructions for a Vanity Chest
Plans and Instructions for A Desk
How to Build a Study Utility Table
Plywood Boats for Pleasure and Profit
Director of Exterior Fir Plywood Boat Plans
Garden Potting Bench
Portable Planter Screen
Picnic Cabinet
Dog Proof Trash Can Bin
Toy Storage Sand Box
Hanging Storage Box
Playhouse-Winter Storage
Portfolio of Do-It-Yourself Home Storage Projects

Frederick Post Company, The
Hamlin and Avondale Avenues
Chicago, Illinois

Decimal Equivalents and Millimeter Chart

Greenlee Tool Company
Rockford, Illinois

Boring Chart for Wood Screws, no charge
Handy Calculators, 25¢

Irwin Auger Bit Company, The
Wilmington, Ohio

How to Know the Size of a Bit

North Brothers Mfg. Company
Lehigh Avenue and American Street
Philadelphia 33, Pa.

The Right "Yankee" Tools for the Right Training

The Crow Electri-Kit for Beginners and the Crow Basic Electronics Kit have brought electricity and electronics into thousands of schools . . . schools where these subjects were long considered too difficult or too expensive to teach.

Now Crow brings you Model 53—a unique *Advanced Electronics* kit. This "learn-by-doing" kit gives your students penetrating insight into the fascinating world of Radio Transmitting and Receiving, Industrial Electronic Controls, Electron Tube Theory, and Basic Radar and TV.

With the kit's 108 components, students *build their own operating assemblies.* A correlated, 400-page work manual gives complete directions for assembly plus historical background and practical applications of each experiment. Written in simple language using only elementary mathematics, the manual permits teachers with limited technical training to teach the course easily.

Model 53 is the comprehensive, common-sense way to practical electronic knowledge, yet its cost is remarkably low. The complete kit as shown above—*nothing else to buy*—costs only $155. *Write for illustrated folder.*

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Division of Universal Scientific Co., Inc. • Box 3366 • Vincennes, Indiana

Red Cedar Shingle Bureau
5510 White Building
Seattle 1, Washington

Red Cedar Shingle Over-Roofing, Blue Print No. 924
Red Cedar Shingle Standard Roof, Blue Print No. 293
Red Cedar Shingle Double-Coursed Sidewall, Blue Print No. 920
Governing Capacities and Approximate Nail Requirements of Certigrade and Red Cedar Shingles

Southern Pine Association
National Bank of Commerce Building
New Orleans 4, Louisiana

Principles of Frame Construction
Distribution is restricted to states east of the Mississippi River, and Arkansas, Iowa, Louisiana, Missouri, Kansas, Texas and Oklahoma, High Schools, Colleges and Vocational Schools. Borrower pays return transportation charges on films.

Southern Pulpwood Conservation Association
1224 Peachtree Street, N. E.
Atlanta 5, Ga.

I Grow Trees — 11" x 14" display

Stanley Tools
Educational Dept.
New Britain, Conn.

Three sets of plans on furniture projects, write for price

Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

Forest Regions of the United States, 18 by 20 inches, colored
Safe Handling of Hammers, make sure hammer is in good condition, avoid injury; industrial safety charts series P, 1-6 (1946) 11.1 x 43.3 in. 10¢
Safe Operation of Freight Elevators: Industrial safety charts, series T, 1-6 (1946) 11.1 x 50.6 in., 5¢
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Safety Around Grinding Wheels, Industrial safety charts, series F, 1-6 (1945) 11.3 x 44 in., 10¢
Safe Practices Around Circular Saws: Industrial safety charts (series B), 1-6. (1945) 11 x 43.4 in., 5¢
Use Screwdriver Correctly, 10¢
Use Woodcutting Band Saws Safety, 10¢
Alaska Yellow Cedar, 5¢
American Basswood, 5¢
American Beech, 5¢
American Holly, 5¢
American Sycamore, 5¢
Ash, 5¢
Aspen, 5¢
Atlantic White-Cedar, 5¢
Baldcypress, 5¢
Balsam Fir, 5¢
Balsam Poplar, 5¢
Birch, 5¢
M 5159, How a Tree Grows, 16 by 21 inches. Colored
M 5293, What we Get From Trees, 27 by 39 inches, colored
M 5139, Suggestions for Cutting Pulpwood
M 5294, Timber Crops for Southern Farmers

United States Forest Service
Washington 25, D. C.

W-3, How a Tree Grows, 16 by 21 inches
W-7, Smokey Bear — Forest Fire Prevention, 18 by 26 inches
D-3, How Fire Ruins Timber, black and white, 8 by 10½ inches
D-4, How a Tree Grows, black and white, 8 by 10 inches
D-5, What We Get From Trees
D-8, The Tree and the Soil
V-1, Maps, colored, Forest Trees and Forest Regions of U. S.
AIB-49, Our National Forests, 20¢
AIB-71, Water and Our Forests, 10¢
AIB-83, Highlights in the History of Forest Conservation, 15¢
AIB-91, The Work of the U.S. Forest Service, 10¢
FB-1989, Managing the Small Forest, 20¢
G-7, You and Forest Fires
L-282, Know Your Watersheds
MP-388, Living and Forest Lands, 10¢
AH-53, Forestry for 4-H Clubs, 20¢
Unnumbered, Products of American Forests, 20¢
TDS-E, Trees of Eastern United States, 16 species
TDS-S, Trees of Southern United States, 16 species
TDS-W, Trees of Western United States, 10 species
O-31, The Well-Kept Farm Woods
K-1, All Aboard the Forestry Special, a playlet

Walker-Turner
Division Kearney & Trecker Corporation
Plainfield, New Jersey

Danny's Safety Rules
Use of the Grinder
Gus' Safety Rules
Shoe Shine Stand
Andy's Safety Rules
Jerry's Safety Rules
Sid's Safety Rules
Jimmy's Safety Rules
Billy's Safety Rules
Sammy's Safety Rules
Larry's Safety Rules
Use of the Band Saw
Use of the Lathe

(Continued on next page)

from its big ball-bearing spindle . . . .

. . . . to the precision carriage . . . .

along its rugged, accurate bed . . . .

to the tailstock . .

. . . . and down to the variable speed drive . . .

and its solid, strong, convenient cabinet

. . . . the No. 6560 Logan 14" Lathe is ruggedly proportioned, precision built and dynamically balanced. Its superiority is evident as it hogs the heavy cuts with almost no perceptible vibration, and produces precision results. Trains the student on an industrial lathe. At your Logan dealer's. Write for Bulletin 14-L.

SPECIFICATIONS AND FEATURES
14⅝" swing over bed
9" swing over saddle
1⅝" spindle hole
1" collet capacity
40" between centers
Variable Speed Drive
Ball Bearing Spindle
38 to 1200 rpm

LOGAN ENGINEERING CO.
4901 WEST LAWRENCE AVENUE • CHICAGO 30 ILLINOIS

TEACHING MATERIALS

(Continued from previous page)

West Coast Lumbermen's Association
1410 S. W. Morrison Street
Portland 5, Oregon

The Lumber Contents of a Douglas Fir Log
Small Hand Samples of Douglas Fir

WOODS — FILM MATERIALS

American Forest Products Industries, Inc.
1816 North St. N.W.
Washington 6, D. C.

From Trees to Paper, 16mm. sound
Trees for Tomorrow, 16 mm. with sound
From Trees to Lumber, 16mm. with sound

Associated Cooperage Industries of America, Inc., The
408 Olive Street
St. Louis 2, Missouri

Helping America Deliver the Goods, 16mm. sound color film
The Container on Wheels, 16mm. sound color film

California Redwood Association
576 Sacramento Street
San Francisco 11, California

Sempervirens, 16mm. sound color, shows how modern forestry works with nature toward perpetuation of redwood supplies, 16mm.
In Your Hands, sound and color strip

Champion Paper and Fibre Company, The

Public Relations Department, General Office
Hamilton, Ohio

Good Business, 16mm. sound color
Paper Work, 16mm. sound color
Deep Roots, 16mm. sound color

Douglas Fir Plywood Association
1119 A Street
Tacoma 2, Washington

Farm-in-a-day, 16mm. color and sound
Prefabrication with Plywood, 16mm. color and sound
Building a Farm Freezer, 16mm. color silent
The Miracle in Wood, 16mm. color and sound
Revival of a 100-Year-Old Farm Home, 16mm. color and sound
More Room at Home, 16mm. color and sound
7 Do-It-Yourself Ideas for More Storage at Home, 16mm. color and sound
The Plywood Fleet, 16mm. color sound
Prefabrication with Plywood, 16mm. sound color
Plywood on the Farm, 16mm. sound color
How to Finish Plywood, 16mm. sound color

Fine Hardwoods Association, The
666 N. Lake Shore Drive
Chicago 11, Illinois

Faces and Figures, 16mm. sound color

Fir Door Institute
1205 Rust Building
Tacoma 2, Washington

The Doorway to Happiness, 16mm. sound color

General Motors Corp.
Central Office
Educational Relations
Public Relations Department
Detroit 2, Michigan

ABC of Hand Tools, loan, 16mm. color
ABC of Internal Combustion, loan, color, 16mm.
ABC of the Automobile Engine, loan, color, 16mm.
ABC of the Diesel Engine, 16mm. color
ABC of Jet Propulsion, loan, 16mm. color
Diesel — The Modern Power, loan, 16mm. color
Where Mileage Begins, loan, color, 16mm.

Insulation Board Institute
111 West Washington Street
Chicago 2, Illinois

Designed for Living, 16mm. sound color

International Paper Company
Southern Kraft Division
Mobile 9, Alabama

In Partnership with Nature, 16mm. sound color
How Money Grows on Trees, 16mm.
How Money Goes up in Smoke, 16mm.
The Little Trees that Went to School, 16mm.
How Does the Tree Crop Grow?, 16mm.

Long-Bell Lumber Company, The
Longview, Washington

Tree to Trade, 16mm. sound color

Mahogany Association, Inc.
75 East Wacker Drive
Chicago 1, Illinois

Mahogany — Wood of the Ages, 16mm. sound color
Wood of the Ages — Yesterday, Today and Tomorrow, 16mm.

Masonite Corporation
111 West Washington Street
Chicago 2, Illinois

Masonite Magic at Ukiah, 16mm. color and sound

(Continued on page 26A)

Nichols Miller
STANDARD MODEL

The Standard Nichols Miller often proves to be the handiest (and busiest) machine in the shop. Its unusual versatility is due to the "rise and fall" spindle head — the spindle being mounted in a counter-balanced sliding head which allows the cutter to be brought to the work. This unique feature, plus conventional screw or lever movements of table, saddle and knee, guarantees fast, economical production on the widest variety of parts. And the unexcelled quality of Nichols' design and workmanship commands the respect of every owner and operator.

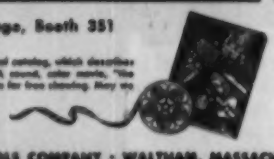
"the miller that uses its head!"

CONDENSED SPECIFICATIONS

Table Working Surface	08" x 21" or 20"
Longitudinal Travel	10" or 15"
Transverse Travel	7"
Vertical Travel — Knee	15½"
Rise and Fall of Spindle	4½"
Selective Speed Ranges up to 5000 R.P.M.	
Weight	1200 lbs.

ASTE Show, Chicago, Booth 351

Write today for the Nichols general catalog, which describes the six models of Nichols Millers. A sound, color movie, "the Miller that Uses its Head" is available for free showing. May we reserve it for you?



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- Covers fundamentals of hand woodworking
- Provides instruction on basic handtool operations
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- Plenty of new projects
- Valuable technical and related information.
- All about tools and how to use them, types of occupations, sources of wood, processing

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PUBLICATION DATE August 25, 1955

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School.....

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City.....Zone....State.....

TEACHING MATERIALS

(Continued from page 24A)

Merit Productions Motion Pictures
40 East 49th. Street
New York 17, New York

Joinery, full color 80-frame filmstrip

Modern Talking Picture Service Film Libraries are located at:

Atlanta 3, Georgia – 247 Spring St., S.W.
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Cedar Rapids, Iowa – 720 Third Ave., S.E.
Charlotte 6, N. C. – 501 No. College St.
Chicago 11, Illinois – 140 East Ontario St.
Cincinnati 2, Ohio – 9 Garfield Place
Cleveland 14, Ohio – 1008 Superior Ave.
Dallas 1, Texas – 413A No. Ervay Street
Denver 9, Colorado – 583 South York St.
Detroit 1, Mich. – 4754 Woodward Ave.
Harrisburg, Pa. – 928 North Third Street
Houston 2, Texas – 2610 Fannin Street
Indianapolis 4, Ind. – 102 E. Vermont St.
Kansas City 5, Missouri – 1321 Main St.
Los Angeles 57, Calif. – 2400 W. 7th St.
Memphis 4, Tenn. – 1754 Madison Ave.
Milwaukee 3, Wisconsin – 840 No. Plankinton Avenue
Minneapolis 2, Minn. – 1112 Nicollet Ave.
New Orleans 12, La. – 815 Poydras St.
New York 20, New York – 30 Rockefeller Plaza Concourse Shop #51
Omaha 2, Nebraska – 1410 Howard St.
Philadelphia 7, Pa. – 243 So. Broad St.
Pittsburgh 22, Pennsylvania – 339 Blvd. of the Allies
St. Louis 5, Mo. – 612 No. Skinker Blvd.
Oakland 9, California – 6117 Grove Street (San Francisco Area)
Seattle 5, Wash. – 5514 University Way
Washington 5, D. C. – 903 15th St., N.W.

Green Harvest, technicolor, 16mm.
The New Paul Bunyan, technicolor, 16mm.
Trees to Tribunes, color, 16mm.

Northeastern Lumber Manufacturers Association
271 Madison Avenue
New York 16, New York

The Story of Wood in the Northeast, 16mm. sound color

Southern Hardwood Producers, Inc.
805 Sterick Building
Memphis 3, Tennessee

The Southern Hardwoods — Yours Forever, 16mm. sound color

Southern Pine Association
National Bank of Commerce Building
P. O. Box 1170
New Orleans, Louisiana

The Inside Story of a Good Home, 35mm. sound-slide film
The Sound of America, 16mm. film in color

Distribution is restricted to states east of the Mississippi River, and Arkansas, Iowa, Louisiana, Missouri, Kansas, Texas and Oklahoma. High Schools, Colleges and Vocational Schools. Borrower pays transportation charges on return of films.

Southern Pulpwood Conservation Association
1224 Peachtree Street, N. E.
Atlanta 5, Georgia

Woods and A Way, 16mm. sound and color
Lonnie's New Crop, 16mm. sound and color
Fire Call!! 16mm. sound and color
Birth of a Southern Pine, 16mm. sound and color
When a Fellow Needs a Forester, 16mm. sound and color
Paper and I, 16mm. sound and color, also black and white

Timber Engineering Company, Inc.
1219 Eighteenth Street, N. W.
Washington 6, D. C.

Coming Out of the Woods, 16mm. sound color

U. S. Department of Agriculture
Washington 25, D. C.

Easier Ways of Logging, 16mm. color
Little Smokey, 16mm. sound, color and black and white
Our White Pine Heritages, color
Pine Ways to Profit, 16 and 35mm., black and white
Return of the Pines, color
A Tree Grows for Christmas, 16mm. sound, color and black and white
Trees to Tame the Wind, 16 and 35mm., black and white

U. S. Forest Service
Washington 25, D. C.

Dead Out, sound film, 16mm. kodachrome
Don't Let It Happen, sound film, 16mm. black and white
The Frying Pan and the Fire, sound, 16mm. kodachrome
It's No Picnic, sound, 16mm. kodachrome, black and white
Little Smokey, sound, 16mm. kodachrome, black and white
A Most Dangerous Combination, sound, 16mm. and 35mm. black and white
Pine Ways to Profit, sound, 16mm. and 35mm. black and white
Smokey Bear Forest Fire Prevention, Series I, sound, 16 and 35mm. black and white, shorts
Smokey Bear Forest Fire Prevention, Series

(Continued on page 28A)

the Improved
B-G 4in1
Locker Type Bench for the School Shop
E-4 Locker Type. Write for price.
Now with Spring Hinges and 2¼" Maple Top, Electronically Glued
The exclusively B-G King Size woodworking bench that enables students to do more in less space. Sturdy, reinforced 64" x 54" top of selected, properly seasoned, kiln dried 2¼" maple precision cut, electronically glued, rigidly bolted for extra long life, and finished in natural with Nelsonite. Four separate work stations with a 5 CD Columbian vise at each corner reinforced with heavy 5" batten providing solid, indestructible foundation. 12 lockers sturdily constructed of heavy gauge metal and finished in attractive olive green enamel. Lockers are equipped with Spring Hinges and each door contains provision for cylinder lock installation. Bases are equipped with angle irons to secure the tops and make for easy installation. Height is 32¼ inches.
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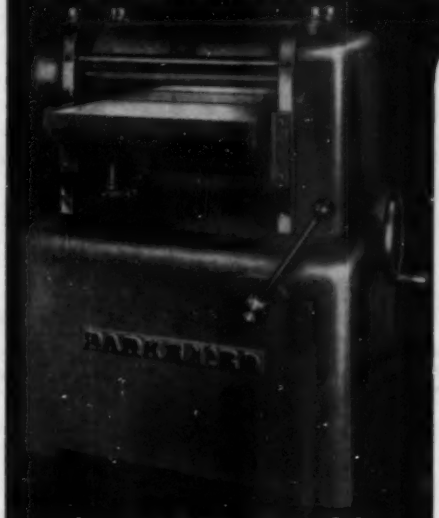
Your Students Will Learn FASTER on a PARKS PLANER



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20" PLANER

Students advance quickly on Parks Planers because they find them easy to operate, safe, and accurate. And, since both the Parks 12" and Parks 20" Planers have been designed and precision-built for accuracy and high-speed line production in industry, they are ideally suited for the school shop because they give practical experience on the type of machines your students will eventually use. Both machines are priced low enough for even the most modest shop budget.

The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

The Parks Heavy-Duty 12" x 4" Planer. A compact, sturdy thickness planer that offers mill planer precision at low price. Has feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16".

Write for complete descriptive literature.

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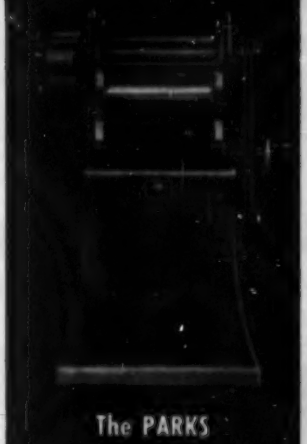

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Heavy-Duty
12" x 4" PLANER

The PARKS WOODWORKING MACHINE CO., Dept. —24, 1546 Knowlton St., Cincinnati 23, Ohio

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Our 1956-57 catalog will be ready in March—get your name on our mailing list today!

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This ONE Machine
automatically files and joints
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The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back, and mitre box saws from 5 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

30-DAY TRIAL OFFER

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

TYPICAL SCHOOL USERS

Berea College, Berea, Ky.; Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee, Wis.; Charleroi School District, Charleroi, Pa.; Redlands Public Schools, Redlands, Calif.; Stout Institute, Menomonie, Wis.

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Please send information and Trial Offer on Foley Saw Filers.

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School.....

Address.....

TEACHING MATERIALS

(Continued from page 26A)

II, sound, 16 and 35 mm. black and white, Musical Trailers
Smokey Bear Forest Fire Prevention, Series III, sound, 16 and 35 mm. black and white, Pledge Trailers
Smokey the Bear, sound, 16 and 35 mm. black and white
Strength of the Hills, sound, 16 and 35mm. black and white
Then It Happened (See Don't Let It Happen), sound, 16mm. kodachrome
Building the Fire Line, sound, 16mm. kodachrome
Do It With E's, sound, 16mm. kodachrome
Easier Ways of Logging, sound, 16mm. kodachrome
Fighting Large Fires in Brush and Grass, sound, 16mm. kodachrome
Fire in the Forest, sound, 16mm. kodachrome
Forest Fire Fighting in the South, sound, 16mm. kodachrome
Forest Smokechaser, sound, 16mm. kodachrome
Grass and Brush Fire Fighting, sound, 16mm. kodachrome
Horse Sense, sound, 16mm. kodachrome
Only a Bunch of Tools, sound, 16mm. kodachrome
Smokejumpers, sound, 16mm. kodachrome, black and white
Water on the Fire, sound, 16mm. kodachrome
Every Man's Empire, sound, 16mm. kodachrome
Extra Forest Dollars, sound, 16mm. kodachrome, black and white
Ocala, sound, 16 and 35mm. black and white
Tongass Timberland, sound, 16mm. kodachrome
Woodland Manners, sound, 16mm. kodachrome, black and white
Adventures of Junior Raindrop, sound, 16mm. kodachrome
Lifeblood of the Land, sound, 16mm. kodachrome
Mountain Water, sound film, 16mm. kodachrome
Waters of Coweets, sound, 16mm. kodachrome, black and white
A Tree Grows for Christmas, sound, 16mm. kodachrome, black and white
Avalanches to Order, sound, 16mm. kodachrome, black and white
Battle of the Beetles, sound, 16mm. kodachrome, black and white
The Greatest Good, sound, 16mm. kodachrome, black and white
Guardians of the Wild, sound, 16mm. black and white
Rainbow Valley, the Story of a Forest Ranger, sound, 16mm. kodachrome, black and white
Snow Ranger, sound, 16mm. kodachrome, black and white
Longer Life for Wood, sound, 16mm. kodachrome, black and white
Operation of a Forest Nursery, sound, 16 and 35 mm. black and white
River Run, sound, 16mm. kodachrome, black and white
Timber and Totem Poles, sound, 16mm. kodachrome
Trees to Tame the Wind, sound 16 and 35mm. black and white

West Coast Lumbermen's Association
1410 S. W. Morrison Street
Portland 5, Oregon

Lumber for Homes, 16mm. sound color
The Magic of Lumber, 16mm. sound color
This is Lumber, 16mm. sound color
The Story of West Coast Lumber — A Permanent Timber Supply for America, 66-frame, 35mm. black and white filmstrip
Fighting Fire in West Coast Woods (forest protection), Kodachrome slide
Harvesting Trees in West Coast Forest (logging), kodachrome slide

Both sets consist of some 35 2" x 2" kodachrome slides, each accompanied by a teacher's manual containing description of each slide and reference material. Available to Washington, Oregon and northern California public schools. Others should inquire regarding availability and cost.

Earthquakes and Construction, 16mm. sound, color
Forests at Work, 16mm. sound color
The Enemy is Fire, 16mm. sound color
The Lumber States, 16mm. sound, black and white

Western Pine Association
510 Yeon Building
Portland 4, Oregon

The Bounty of the Forest, 16mm. sound color
Fabricating the Western Pines, 16mm. sound
Building a Home with Western Pines, 16mm. sound
Harvesting the Western Pines, 16mm. sound on film
The Bounty of the Forest, sound, 16mm.
Operation Attic, sound, 16mm.

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P. O. Box 629
Newark, New Jersey
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Tacoma, Washington

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"MICROMETER READING MADE EASY"
Interesting 12-page booklet is cleverly illustrated in cartoon style. Tells how to read to both thousandths and ten-thousandths of an inch. How to care for and adjust a micrometer.

"TIME SAVERS"
Circular slide rule type. Gives size of tap, threads per inch, size of tap drill, and decimal equivalents.

"DRILL CARDS"
Gives decimal equivalents of parts of an inch on one side, and decimal equivalents of number size drills on the other side.

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20-page four-color booklet traces the history of measurement from prehistoric times to the present. Interesting cartoon style.

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Please send me, without charge, shop teaching aids in the quantities indicated.
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_____"Time Savers"
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_____"The Amazing Story of Measurement"
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School_____
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399

Green Harvest, 16mm. sound technicolor
The New Paul Bunyan, 16mm. sound

Wood Conversion Company
First National Bank Bldg.
St. Paul 1, Minnesota

Happy House, 16mm. sound
Nu-Wood Tile Applications, strip film
Balsam-Wool Insulation Application, strip film

Zellerbach Corporation, Crown
343 Sansome Street
San Francisco 19, California

Forests for the Future, 16mm. sound color

— Finis —

ASSOCIATION NEWS

(Continued from page 32A)

were then applied with no limit placed on the imagination.

The links were fired in a kiln, touched up, fired again, and the snaps were then soldered to the backs.

It was fairly evident that the LACIEA had held one more successful and interesting dinner meeting for the records.

AUDIO-VISUAL CONFERENCE AT STOUT

With its theme "Financing Audio-Visual Programs," Stout State College, Menomonie, Wis., will hold its fourth annual audio-visual conference on Tuesday, April 10, 1956. Audio-visual specialists, administrators, and teachers from several midwestern states will attend.

Principal speaker for the event will be Professor L. C. Larson, director of the audio-visual center at Indiana university. Mr. Larson is also vice-president of the Department of Audio-visual Instruction of the NEA.

Dr. David Barner, head of the audio-visual center at Stout State College, will be general chairman of the conference. He announces the following sectional meetings to be held within the general conference:

Financing the county audio-visual program, organizing and financing the co-operative film library, financing the rural school audio-visual program, and financing the small city audio-visual program.

OIAA CONVENTION

The annual convention of the Ohio Industrial Arts Association will be held March 22, 23, and 24, at the Neil House in Columbus, Ohio.

AMERICAN INDUSTRIAL ARTS ASSOCIATION CONVENTION

Many features of unusual interest, some of which have never appeared at a major educational convention, will highlight the 18th Annual Convention of the American Industrial Arts Association at Milwaukee, April 24–27, 1956.

These feature exhibits and demonstrations include the outstanding "Civilization Through Tools" exhibit with a talk and an exhibit prepared and presented by the Wilkie Foundation; and the 68 prize-winning projects in the Ford Industrial Arts Award Program from Wisconsin, Minnesota, Iowa, Michigan, Illinois, and Indiana.

For teachers there will be the Master Craftsmanship exhibit of teacher craftwork which offers the opportunity for all industrial-arts instructors to enter their finest work. Of special interest, too, are the exhibits of projects exhibited by industrial-arts students from Milwaukee and suburban schools; the exhibit of fine furniture pieces; and the student-teacher demonstration illustrating new classroom techniques for giving classroom demonstrations.

The Milwaukee Local Arrangements Committee under the direction of Roy A. Radtke has nearly completed both the professional program and the plans for the housing and entertainment of conventioneers and their wives. Trips to Milwaukee industry, tours through the beautiful new Custer high school with its comprehensive shops and other local schools — plus special entertainment will round out what is expected to be the most interesting and the best-attended convention of the American Industrial Arts Association.

E.P.T. INITIATES FOURTEEN NEW MEMBERS

Fourteen new members were formally welcomed into Theta chapter of Epsilon Pi Tau, Wednesday, October 26 at a banquet at the Hotel Marion following the formal initiation.

The new student members are: William Allen, Roy Eckes, Maurice Guptill, John Johnson, Anton Kotyza, and Jerome Loushin, Paul Palmer, Francis Rauscher, Robert Robecker, Merlin Schendel, and Carl Smith.

Dr. G. S. Wall, Stout faculty member and Harold Rasmussen, former Stout graduate from Des Moines, Iowa were also initiated into the fraternity.

Members of the initiation team were Robert Erickson, president; Dean Price, Dean Jarvis, Jerome Abbott, Joseph Koch, Robert Swanson, Glen Matl, and Orville Nelson.

It is believed that the first drive-in service station began operations in 1905, at the plant of the Automobile Gasoline Company, in St. Louis. — *Petroleum Newsnotes.*

FIBERGLASS PROJECT OF THE MONTH

These action photos are typical of the close-cut instructions in the Marine edition of THE CASTOLITER, "How to Make Old Boats New." The same directions also apply to covering new boats with fiberglass.

FIBERGLASS BOATS ARE BEGINning to appear on the market in increasing numbers. However, the majority of boats will continue to be made of wood for a long time to come. There are many reasons for this, not the least of

This fiberglass hull covering kit contains all the materials used to cover a 12 foot boat from gunwale to gunwale and from stem to stern. Price: $38.50

which is fiberglass, the very material which is also competing with wood for the boat market.

Caulked and Painted — Once and For All

A fiberglass-covered wooden boat hull, whether new or old, requires little maintenance. The annual chore of caulking, painting and refinishing is eliminated and upkeep becomes a minor factor. The tough, resilient glass skin leakproofs and weatherproofs the hull and this laminate will not rust, rot corrode or crack in any kind of weather — 50° below zero or 100° in the shade. The protected hull won't swell in the water nor contract on the high and dry beach. The boat can be left outdoors and yet be instantly ready for the water whenever you are. No wonder that more than 300,000 boats have been fiberglass treated within a few short years.

Ten Standard Fiberglass Hull Covering Kits Are Available for Boats From 8 to 16 Feet.

These kits are priced at $18.50 to $69.50. A list of materials for each kit and a general marine price list will be mailed to you upon request. You can also order materials in bulk if your boat is larger or smaller than average.

— 10% DISCOUNT! —

The big rush in our Marine Division starts after the middle of March. To help balance production, we are offering this 10% discount on all fiberglass boat kits and bulk supplies for boats, effective until and including March 15, 1956. Save money by ordering NOW!

Write for the Free Marine Edition of THE CASTOLITER

"How to Make Old Boats New" is a photo illustrated manual which explains in simple step-by-step directions how to laminate old or new wood boats with Castoglas-Fiberglass. It is of timely interest to all teachers and students of woodshops, but especially to the many boat builders in adult evening classes. Now is the time to ask for your free copy. Write to:

School Department B-50

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Woodstock, Illinois

Producers and Distributors of Liquid Plastics and Fiberglass for Laminating Casting, Molding and Coating Serving Industry, Science, the Arts and Crafts.

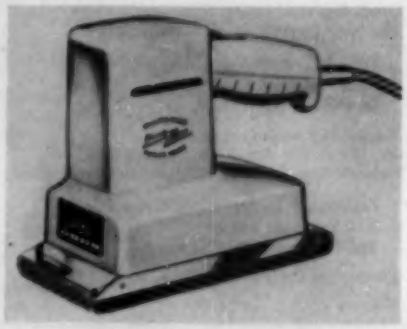
Shop Equipment News

MILLERS FALLS ORBITAL SANDER

A new electric orbital sander was introduced recently by the Millers Falls Company, which will undoubtedly be well received by home craftsmen. The professional finish produced by this "Dyno-Mite" sander will find ready acceptance with cabinetmakers, carpenters, patternmakers, boat builders, repairmen, painters, and auto body finishers.

This tiny 5/32-in. orbital sanding diameter permits operation with or across wood grain without leaving discernible marks or whorls.

This sander can be used to clean and finish flush to baseboard, stair risers, or other vertical planes without marring or scars. Its light weight (only five pounds) makes it easy to use on vertical or overhead surfaces. The sander is ideal for rubbing down between coats of paint, varnish, or shellac, and using the correct abrasives, it can be used to remove paint and varnish or to work out scratches, digs, and other blemishes. The platen, or sanding shoe, is faced with sponge rubber; hence, either wet or dry abrasives can be used. The platen is 3¾ by 7¼ in., accommodating exactly one third of a standard abrasive sheet firmly held in its two spring clamps. It has a positive on or off switch and comes equipped with seven feet of type SJ three-wire cord with 3-prong molded-on plug and 2-prong adapter with grounding wire. Included are three pieces of close-coat and open-coat No. 3/0 (120) waterproof paper.



New Orbital Sander

(For Convenience Circle Index Code 0201)

New *the ONLY complete coverage!*

WOODSHOP TOOL MAINTENANCE

No other book has such an outstanding, up-to-date and complete coverage of the maintenance of woodworking machines and tools. Enables all those who use woodshop equipment to analyze and solve everyday problems . . . no other book explores the subject so thoroughly and graphically.

Has hundreds of photos, drawings and diagrams to show exact methods of sharpening saws, power saw blades, chisels, gouges and many other tools. Illustrates machine parts to simplify maintenance procedures. After performing several of the maintenance jobs outlined, the student develops the knowledge required to cope with variations in maintenance problems caused by differences in manufacturers' products . . . A MOST VALUABLE FEATURE OF THIS BOOK!

Divided into two parts . . . maintenance of hand tools and maintenance of power tools. Over 350 large pages; over 400 illustrations. By BERYL M. CUNNINGHAM and WILLIAM F. HOLTROP (#1 in coupon).....$5.76

A Great New Project Book

MAKING THINGS OF WOOD

A wonderful new refreshing book that's the result of the authors' experience of many years in teaching junior high school industrial arts. For the beginning shop student — from the simple to the more complex — requiring minimum materials, but providing a wealth of opportunities for learning-by-doing experiences.

Many projects combine wood with metal, electricity and plastics. Each includes an easy-to-read drawing, bill of material, construction procedures and photographs. Procedures are not too detailed, serving merely as a guide so that the student is provided with planning experiences. Includes chapters on project selection, teaching aids, and finishes — providing valuable information which applies directly to the projects in the book. Nearly 140 clear illustrations show finished projects and methods of doing work. By LYLE P. SOETEBER and PAUL R. MOORE. (#2 in coupon).....$3.00

ADVANCED WOODWORK AND FURNITURE MAKING

For advanced students . . . co-ordinates teaching with the two great developments in modern woodworking . . . the popularity of the new small-size power tools and MODERN furniture styles. It's practical, clear and thorough in its coverage of designing, planning, safety, care and use of tools. Over 300 clear, up-to-date photos . . . 400 fact-filled pages, half of which cover use of power tools, including jigs. Contains a wealth of idea-developing projects . . . hundreds of ideas on WHAT TO MAKE. By J. L. FEIRER (#3 in coupon).....$3.96

ADVANCED WOODWORKING WORKBOOK

NEW. . . a splendid teaching aid and guide to the student in completing the work covered in the book above. Can also be used separately. OBJECTIVE questions . . . simple to complete and easy to check and correct. By J. L. FEIRER (#5 in coupon).....$1.28

INDUSTRIAL ARTS WOODWORKING

1955 REVISED and ENLARGED! A whole new chapter on design . . . what it is and what goes to make it up. Always considered the best book on the subject . . .and now there are more and better illustrations and projects than ever before! Widely endorsed by leaders in the field. By J. L. FEIRER (#4 in coupon).....$2.96

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NEW ELECTRONICS KIT

A new advanced Electronics Kit from Crow Electri-Craft Corporation simplifies the teaching of electron tube theory, radio transmitting and receiving, industrial electronic controls, and basic radar and television.

Kit Model 53, *Electronic Tubes, Circuits and Devices*, is designed for the upper high school and junior college level. It is the third in a series of Crow visual experiment kits that takes students from the simplest electrical principles to intricate electronic devices.

Working out an experiment with Kit Model 53

With the 108 component parts that make up Model 53, students build their own operating assemblies. The 73 related experiments permit construction of magnetic amplifiers, photoelectric controls, flip-flop circuits, electronic counting circuits, and dozens of other assemblies.

Included with each kit is a 400-page work manual written and illustrated with such clarity that even instructors with limited technical training can easily teach the course. In addition to the step-by-step directions for assembly, the manual gives the historical background and practical applications of each experiment.

(For Convenience Circle Index Code 0202)

NEW LOGAN MILLING MACHINE

Advanced design features are offered in a vertical milling machine announced by Logan Engineering Company. An infinite speed

(Continued on page 34A)

SCHOOL SHOP LUMBER

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We specialize in School Shop lumber!

We have — *ready-to-ship* — 18 species of woods and many special items regularly used in Industrial Arts and Vocational Education classes.

Our lumber is thoroughly kiln-dried, and we ship via truck transport whenever possible — *direct to your school.* Here is the quality and service you require for maximum efficiency.

If you do not have our catalog, with delivered prices, one will be sent you on request—free!

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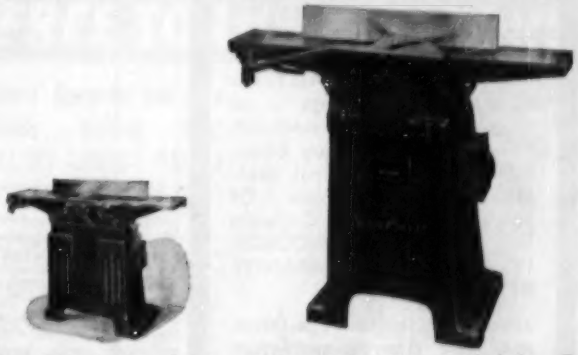
OLIVER Jointers are the heavy type . . . assuring smooth, accurate jointing and fitting!



Oliver 8-in. Jointer planes stock for perfect glue joints. Has 60-inch polished tables. Three-knife cutterhead runs in self-aligning ball bearings. Fence adjustable to 45° across table. Table lowers up to ½ inch for rabbeting. Write for Bulletin No. 144.

Oliver 6-inch Jointer is ideal for all classes of small work. Sturdy, rigid, one-piece frame carries tables, cutterhead, motor, fence and guard. Tables raised and lowered by hand knobs and screw. Fence, adjustable across table, can be tilted up to 45°. Three-knife circular safety cylinder. Write for Bulletin No. 133.

Oliver Jointers also made in 12" to 30" sizes

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Established 1890 GRAND RAPIDS 2, MICHIGAN

This Clamp has a mind of its own!

Wilton's new Rapid Titan® is the fool-proof C-Clamp with both continuous and rapid action. Wilton's patented nut allows the spindle to engage the screw for tightening action — and disengage for rapid action — AUTOMATICALLY No buttons — no springs — no triggers! Wear-proof steel nut; hi-tensile ductile alloy body; full length, precision cut, spatter proof Acme screw. Of course, Rapid Titan C-Clamp has the famous UNCONDITIONAL 3-YEAR GUARANTEE BY WILTON!

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ASSOCIATION NEWS

(Continued from page 6A)

J. Fred Ingram, state supervisor of trade and industrial education, Montgomery, Ala., and treasurer, Charles W. Sylvester, director of vocational education, Baltimore, Md.

Vice-president in charge of home economics, Miss Dorothy Lawson, state supervisor of home economics, Albany, N. Y.

Vice-president in charge of trade and industrial education, Sam Fick, Sacramento, Calif.

The Awards Session was held just prior to the Ship's program on Friday afternoon. The donations made by the members of the Ship were not only appealing but also very numerous.

The 1956 AVA convention will be held December 3 to 7, at St. Louis, Mo.

The 1957 convention will be held in Philadelphia, Pa.

LOS ANGELES COUNTY SHOP TEACHERS MEET

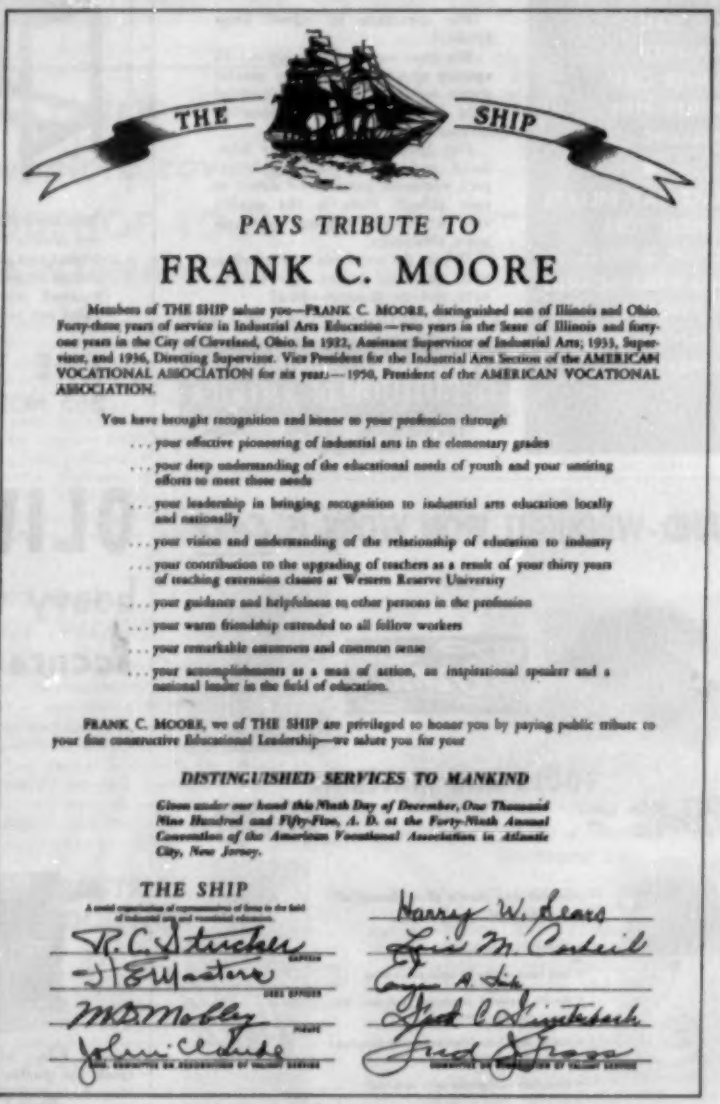
Over 200 Los Angeles county shop teachers assembled at San Marino High School on December 9, in the evening.

It had been announced that all in attendance would go home with a pair of cuff links of their own design.

After dinner, Duane Clogston of Leisurecrafts Company, demonstrated the step-by-step procedure used in copper enameling. The shop instructors and their guests were then given the materials necessary to fashion a pair of cuff links. The price of the findings of the jewelry and other supplies was financed by the association.

Soon the sound of 200 pieces of fine sandpaper scratching against small pieces of copper echoed through the dining hall. Colors

(Continued on page 29A)


THE SHIP
PAYS TRIBUTE TO
FRANK C. MOORE
Members of THE SHIP salute you—FRANK C. MOORE, distinguished son of Illinois and Ohio. Forty-three years of service in Industrial Arts Education—two years in the State of Illinois and forty-one years in the City of Cleveland, Ohio. In 1932, Assistant Supervisor of Industrial Arts; 1935, Supervisor, and 1936, Directing Supervisor. Vice President for the Industrial Arts Section of the AMERICAN VOCATIONAL ASSOCIATION for six years—1950, President of the AMERICAN VOCATIONAL ASSOCIATION.
You have brought recognition and honor to your profession through
. . . your effective pioneering of industrial arts in the elementary grades
. . . your deep understanding of the educational needs of youth and your untiring efforts to meet those needs
. . . your leadership in bringing recognition to industrial arts education locally and nationally
. . . your vision and understanding of the relationship of education to industry
. . . your contribution to the upgrading of teachers as a result of your thirty years of teaching extension classes at Western Reserve University
. . . your guidance and helpfulness to other persons in the profession
. . . your warm friendship extended to all fellow workers
. . . your remarkable calmness and common sense
. . . your accomplishments as a man of action, an inspirational speaker and a national leader in the field of education.
FRANK C. MOORE, we of THE SHIP are privileged to honor you by paying public tribute to your fine constructive Educational Leadership—we salute you for your
DISTINGUISHED SERVICES TO MANKIND
Given under our hand this Ninth Day of December, One Thousand Nine Hundred and Fifty-Five, A. D. at the Forty-Ninth Annual Convention of the American Vocational Association in Atlantic City, New Jersey.
THE SHIP
Harry W. Sears
Fred L. Zimbrick
Fred Krause

Frank C. Moore, Director of Industrial Arts, Cleveland, Ohio, receives Ship's Citation

As usual, the Ship's professional entertainment was well received.

John Claude, chairman of the citation committee, awarded this year's citation to Frank C. Moore, director of industrial arts, Cleveland, Ohio. A reproduction of the citation is shown above.

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For Bulletin write Dean of Summer Session, 613 Johnston Hall

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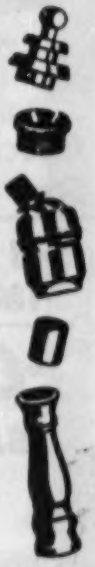

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Supplied with round or special shape holes for all machines.

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SHOP EQUIPMENT NEWS

(Continued from page 30A)

drive provides any desired feed from 80 to 570 r.p.m., in low range, and 584 to 3800 r.p.m., in the high speed range with no belt changes. A built-in tachometer makes the exact spindle speed visible to the operator.

New Logan Milling Machine

The Logan Mill's infinite quill feed provides any desired power feed to spindle from 0 (neutral) to .008 in. The simple positive control of the quill feed makes it easy to obtain correct depth when blind drilling to a given depth.

The ram slides on dovetailed ways that provide a rigid clamping surface 16 in. long, assuring freedom from vibration. In addition, Logan mounts the 1½ h.p. 3-phase motor in the base of the milling machine rather than atop the quill. Consequently, no motor shock, no motor vibration is transferred to the spindle.

The ground table has a 36 by 9-in. working surface. The range is 18 in. longitudinal, 10 in. transverse, and 16¼ in. vertical. The head, which is easily swiveled 360 deg., rotates on a rigid sleeve mounting that maintains exact right angle alignment with no sag between head and ram. Large, convenient dials and hand wheels, and antifriction bearings throughout are among the many other quality construction features.

(For Convenience Circle Index Code 0203)

NEW GRAPHIC ARTS X-ACTO KNIFE

An inexpensive new knife, designed for the graphic-arts field, is the latest addition to the family of X-acto knives, manufactured by X-Acto, Inc.

The new knife is a precision-made tool known as the "No. 4," and constructed like all other X-acto knives on the economical principle of replaceable blades, which are available in packages of five.

New Graphic Arts X-Acto Knife

This No. 4 knife is 5 in. over all, and consists of a ¼-in. cylindrical all-metal handle and a ⅛-in. high carbon steel angled cutting blade. A knurled collar opens and closes the simple blade-gripping chuck.

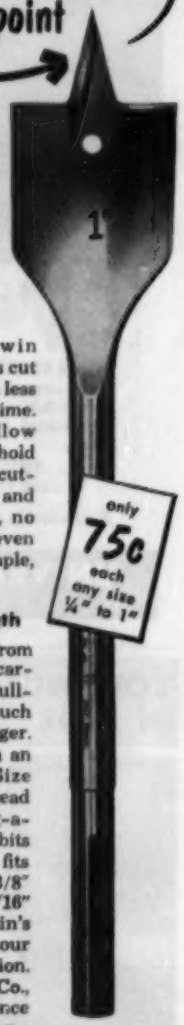
Artists and technicians in advertising, photography, photo-engraving, printing, etc., will find the new X-acto knife an indispensable tool for the fine cutting, trimming, scraping, and scribing operations connected with stencils, friskets, silk screen, retouching, etching, stripping, and make-ready.

(For Convenience Circle Index Code 0204)

NEW IRWIN BIT*

SPEEDBOR "88"

Exclusive hollow ground point



steps-up efficiency of small ¼" electric drills

School Shops using small ¼" electric drills and drill presses can now speed-up class work, increase the boring range of present equipment. New Irwin Speedbor "88" wood bits cut cleaner and deeper with less power and in less time. Irwin's exclusive hollow ground point takes hold faster, new spade-type cutters keep holes clean and accurate. No binding, no clogging, no wobble—even in seasoned hardrock maple, plywood, or plastics.

Hardened Full Length

Forged in one piece from solid bar of special high carbon steel and hardened full-length to stay sharp much longer, last much longer. Easily resharpened with an ordinary hand file. Size markings shown on head for easy selection. Hang-a-Bit hole lets you store bits on nail or pin. Shank fits perfectly in 1/4", 5/16", 3/8" and 1/2" chucks. Sizes 4/16" to 6/16". Include Irwin's new Speedbor "88" on your next purchase requisition. The Irwin Auger Bit Co., at Wilmington, Ohio, since 1885. *Patent Pending

SPEEDBOR "88" Sets

Available in colorful red plastic roll kits. Individual pocket for each bit. Sets of 4, 6 or 11 bits store easily in tool chest or on shelf or work bench. As low as $3.00.

Free Booklet Tells How to Select, Use, Care for Auger Bits. A useful shop training guide. Send name and address to Irwin, Dept. 6B, Wilmington, Ohio.

IRWIN the original solid center auger bit • screw drivers screw driver bits

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NEW DITTO BOOKLET

How to establish and operate an effective school newspaper at lowest cost is explained to teachers in a 24-page booklet available from DITTO, Inc., manufacturer of duplicating machines and supplies.

Titled "Why and How To Publish a School Newspaper," the handy illustrated booklet covers all phases of school newspaper publication, from financing the paper to writing news and feature stories.

The booklet points out that using a direct process (spirit) duplicator can reduce the cost of turning out a newspaper to 10 cents per hundred copies, making it possible for even a class of 50 pupils to have a paper.

Also included is a section on publishing the

(Continued on next page)

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Five

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BLUEPRINT READING

Building Trades Blueprint Reading

Examination Kit: Wolfjes

Contains 6 full-size house plans, one standard specifications form, and an 8 page comprehensive examination. Useful for aptitude and diagnostic testing, as a final exam, and as a teaching aid.

BUILDING TRADES

Architectural and Building Trades

Dictionary: Burke-Dalzell-Townsend

A special section of hundreds of new terms used in modern building has been added to this important, profusely illustrated, practical reference.

CARPENTRY

Fundamentals of Carpentry, Vol. I

Tools, Materials, Practice: Durbahn

This newly revised edition of the popular text retains its wealth of background information, while greatly expanding the reference tables, charts, and the Dictionary of Carpentry Terms.

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(Continued from previous page)

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(For Convenience Circle Index Code 0205)

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The Phillips Furniture Company announces its new fall catalogue of furniture legs, frames, and parts. Featured are contemporary and functionally designed furnishings requiring various degrees of skills for their completion. The projects are specifically designed for use in the field of industrial arts and adult education.

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Modern Desk

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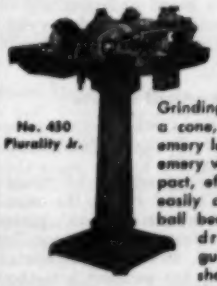

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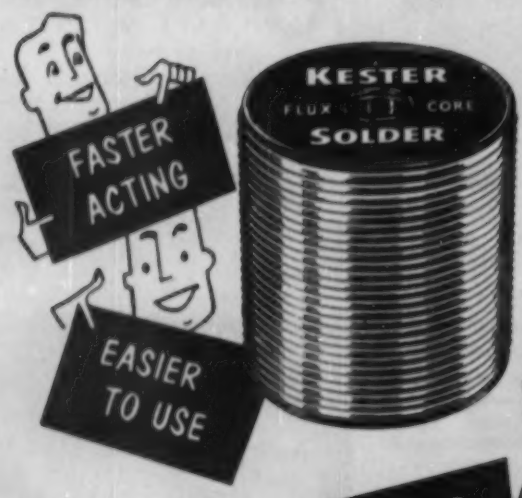

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The Superior Pupil in Junior High School Mathematics

By Earl M. McWilliams and Kenneth E. Brown. Office of Education Bulletin 1955, No. 4, 57 pp., 25 cents. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

What are some of the most promising practices used in the junior high school to provide for the educational needs of talented youth? What administrative procedures are used to identify these pupils? What enrichment techniques have mathematics teachers of heterogeneous classes found especially useful in teaching the superior child? These and many other related questions are discussed in *The Superior Pupil in Junior High School Mathematics*.

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Teaching as a Career

By Earl W. Anderson. Office of Education Bulletin 1955, No. 2, 20 pp., 15 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Any young man or woman who is considering teaching as a career should seek answers to the following questions: How important is teaching? What does a teacher do? What are the requirements for teaching? How may I meet them? How can I get satisfactory employment in teaching? What salary will I receive? What are the retirement provisions? Will I enjoy teaching? Answers to these questions are given in *Teaching As A Career*.

Foundry Practices

By S. E. Rusinoff. Cloth, 261 pp., 5¾ by 8¼ in., illus., $6.50. American Technical Society, Chicago, Ill.

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Complete Measurement Charts

By Gaetan J. Lapick. Cloth, 33 pp., 8¾ by 11¼ in., illus., $4.95. Fairchild Publications, Inc., New York City, N. Y.

This is a new revised edition of "Complete Measurement Charts." It lists the essential measurements of women's, misses', junior and children's garments for reference by manufacturers, buyers, and others interested in sizing. The author has outlined a method by which key measurements may be applied to standardized garment sizes.

The book also shows "How to Take Measurements." It offers three basic types of women's heights — short, regular, tall — as well as the various figure types for which the designer must study and plan to create style.

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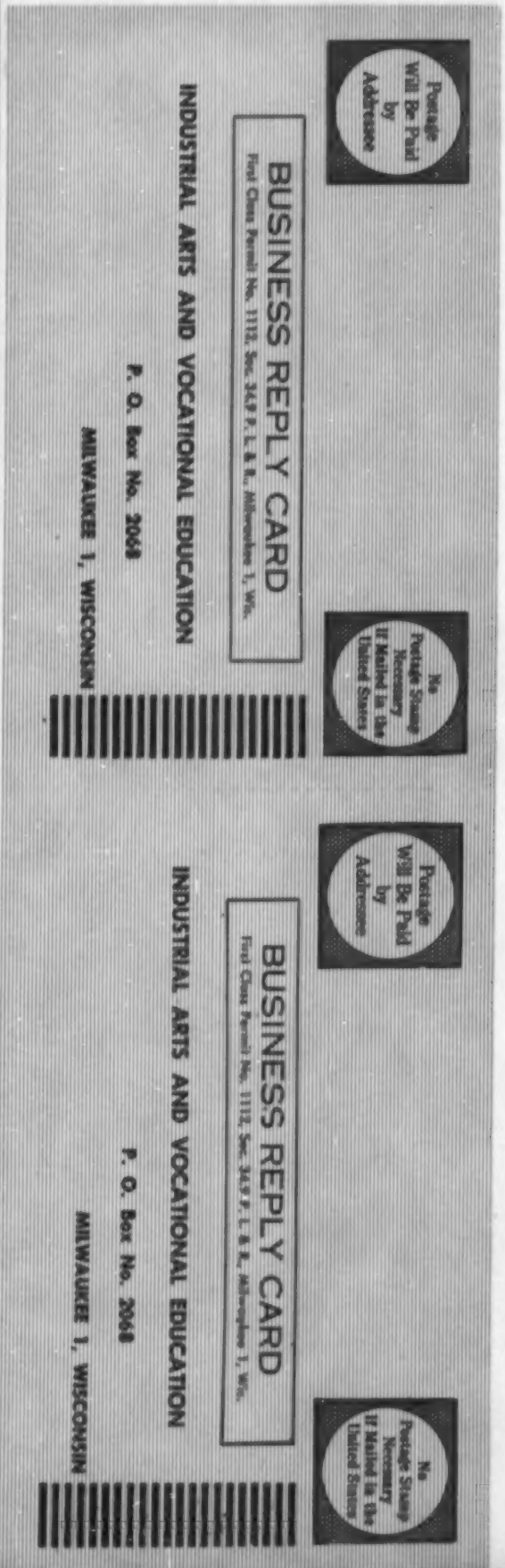
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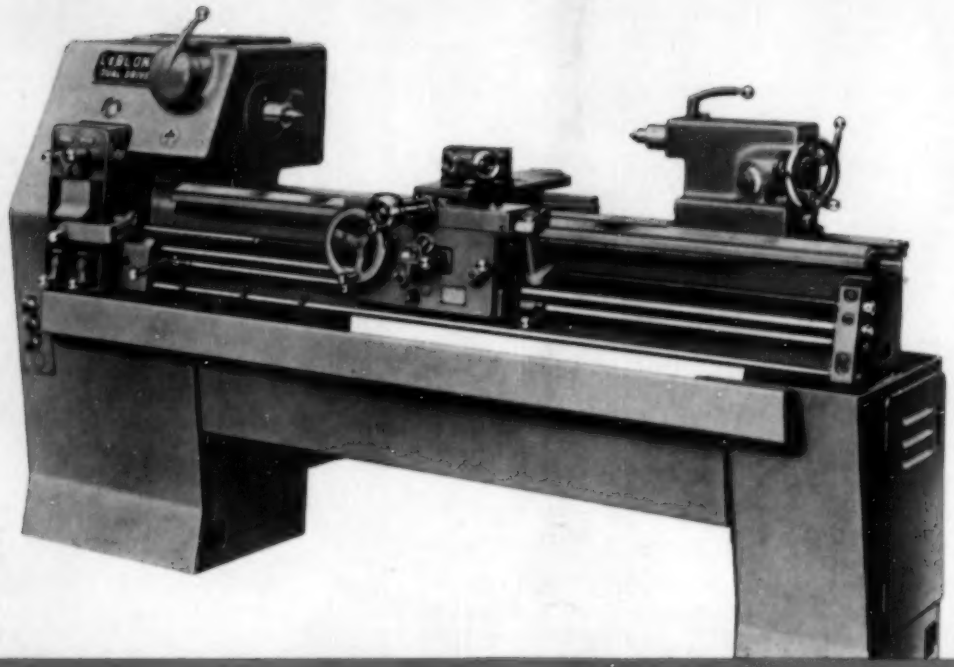

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